EXTENDED TECHNOLOGY ACCEPTANCE MODEL TO UNDERSTAND CUSTOMERS' ACCEPTANCE OF THE INTERNET OF THINGS AND ARTIFICIAL INTELLIGENCE ENABLED SMART HOMES IN INDIA

Rajkiran Pund[a], V. K. Satya Prasad[b], Abhinaw Sinha[c]

[a](Doctor of Philosophy), Research Scholar, Symbiosis International (Deemed University) Pune. E-mail: rajkiran.s.pund@gmail.com Orcid id: https://orcid.org/0000-0002-8987-0277

[b]Doctor of Philosophy, Associate Professor (Marketing), Symbiosis Institute of Business Management, Hyderabad; Symbiosis International (Deemed) University, Pune. Email: vk.satyaprasad@sibmhyd.edu.in; India. Orcid id: https://orcid.org/0000-0001-5022-9143

[c]Doctor of Philosophy, Research Scholar (Marketing), Symbiosis International (Deemed University) Pune. E-mail: abhinaw.ajay1@gmail.com

Abstract

Objective: To use the extended technology model to understand customers' acceptance of the Internet of things and artificial intelligence enabled smart homes in India. The smart home market is expanding rapidly in India and worldwide. As a potential market, it is imperative to understand customer acceptance of smart home technologies and its features.

Method: Use Partial Least Squares – Structural Equation Modelling (PLS-SEM) to assess the customer's acceptance of Internet of Things and Artificial Intelligences enabled smart homes in India. The collected data has been analysed with structural equation modelling using SmartPLS.

Results: This research is aimed to gain insight into customer acceptance of smart homes through an empirical research conducted with a structured questionnaire with seven pointer scale. This research proposes an extended Technology Acceptance Model (TAM) with additional constructs derived from literature analysis and tested with empirical data.

Conclusions: The research will be helpful to smart home devices manufacturers and sellers to understand their customers. It will also be helpful to future *researchers to understand constructs impacting acceptance of smart home technologies.*

Keywords – Smart Homes, Technology Acceptance Model, Internet of Things, Artificial Intelligence.

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1 INTRODUCTION

A smart home is a residence equipped with a communications network, linking sensors and domestic devices and appliances that can be remotely monitored, accessed or controlled, and which provides services that respond to the needs of its inhabitants (Chan et al. 2009, 2008; Reinisch et al. 2011). All smart devices can connect sensors to a central device through the internet. A user can manage and control all connected devices with central devices like Alexa, Siri etc. or mobile applications. The smartness of a home depends on the design of the smart home and devices, sensors, and central device or mobile application a user is using to make the home smart. A variety of services can be availed with a complete set of smart home devices. Smart home technologies enhance the quality of life and promote independent living. (Davit Marikyan,2019). A well-designed smart home can provide various services like voice-controlling home appliances – switch on and off bulbs, fans, open and close doors and curtains, manage washing machines, clean the home, and many more. A Smart home can enhance the standard of living and provide child care, health care, and old age care services. Equipped with Artificial Intelligence, a smart home can go beyond the imagination to make a user's life convenient. Central devices or mobile applications equipped with artificial intelligence can perform day-to-day activities without human intervention. For example, an air conditioner can be adjusted to weather conditions automatically. Smart curtains can be opened and closed depending on the availability of light. Bulbs and fans can be switched off automatically when no one is at home. A smart camera can alarm any suspicious activity. Users can be informed about their health conditions. etc. Apart from convenience, care, and security, a smart home can efficiently manage energy and water conservation. Valentina Fabi, Giorgia Spigliantini, Stefano Paolo Corgnati (2016) lists smart home services under three categories.

Smart homes are primarily designed with the Internet of Things (IoT). The IoT represents the synergy between 1. Things or devices 2. Communication networks (Wifi, Zigbee, LoRa, Cellular) and 3. Cloud-based computing. (Rahul Dubey,2019) In case of smart homes, things are home appliances, switches, smart electric devices, door locks, lighting devices etc. Wifi or cellular data can be used to connect all smart devices to the cloud. All devices used in the smart home should be compatible with communication networks and the cloud. The choice of edge devices, communication networks, and cloud platform plays a crucial role in the design of smart homes. The security of smart homes is ensured by secure communication networks and protocols.

Edge devices collect the information and send it to the cloud platform. Machine learning (ML) Artificial Intelligence (AI) algorithms work on collected data to obtain meaningful insights and respond accordingly. Artificial intelligence plays vital role when it comes to automation and decision making by smart homes. For example – sensors can collect and send information of temperature to the cloud platform, then AI algorithm will set the air conditioner accordingly.

The market for smart home devices is expanding globally and in India. This research studies drivers of acceptance of smart home technologies in India. All technologies are different in nature and has different impact on people and society, which affects acceptance of the technology. Hence, while applying wildly used technology Acceptance Model (TAM), it has to be tested on the ground. This research tries to find out what factors affect acceptance of smart home technologies in India using Technology Acceptance Model (TAM). An exploratory research was conducted using structured questionnaire and collected data has been analysed with Structural Equation Modelling using SmartPLS. The study gives an extended model fit for acceptance of smart home technologies in India.

2 LITERATURE REVIEW

Significant advancements in technology across communication, information, and the Internet sectors have facilitated the creation of high-quality Smart Homes at reduced costs.

Shibin Tad et al. (2023) in the context of marketing automation studied the application and impact of Artificial Intelligence (AI) in the Indian banking sector, specifically its role in optimizing operations and enhancing customer service and marketing. The results reveal a significant correlation between AI implementation and improved banking performance and enhanced marketing . The study foresees a promising future with AI deployment, offering opportunities for cost reduction, enhanced customer experience, and financial inclusion. Isa (2023) examined the perceived organizational support mediated the relationship between talent culture and employee engagement among employees in the Malaysian governments-linked companies. The results indicated that none of the mediated relationship were significant.

Utomo et al (2023) analyzed the relationship between perceived organizational support (POS) and organizational trust, in marketing organization to analyze the relationship between innovative work behavior (IWB) and organizational trust, analyze the relationship between perceived organizational support (POS) and performance, and analyze the relationship between innovative work behavior (IWB) on performance, analyzing the relationship between organizational trust variables and performance. The results indicate that Perceived organizational support has significant effect on performance through organizational trust, organizational trust mediate the relationship between Perceived organizational support on performance.

Vaidya et al., (2023) presented the association Among Remote Working and Work-Life Balance with Mediating Effect of Social Support studying the migrated employees of marketing sector and how AI and ML can mitigate their problems to identify their whereabouts and location.

The domain of Smart Home Services has garnered unprecedented attention in recent times (Raza et al., 2019; Ozturk and Bicen, 2018). Over the past decade, substantial research efforts have been directed towards the field of smart homes. However, there remains a lack of comprehensive information compilation and illustration of previous endeavors in this area, which could guide future research directions (Pantzar & Ropo, 2021). A smart home basically consists of an IoT cloud infrastructure, a platform (e.g., mobile application), terminal devices (such as sensors, intelligent appliances and home gateways) (Shim et al., 2021), as well as a communication network (including link, network, transmission, and application layers) (Wang and Li, 2020).

The academic exploration of smart homes has witnessed a surge since 2011 (Yoo et al., 2021; Zhang et al., 2021). Major technology players like Google, Amazon, Samsung, and Alibaba have been coming up with smart home services and products. Moreover, smart homes possess the ability to analyze and recognize users' daily usage patterns, making them particularly beneficial for individuals with memory impairments (Kim et al., 2020). With reference to energy consumption, smart home services can aid homeowners in reducing energy consumption, automatically conserving energy in response to shifts in indoor energy use, and delivering real-time energy consumption data and billing information (Zhang et al., 2021; Ma et al., 2021). While the potential of smart homes is substantial and they offer various advantages and challenges, viz., system learning costs, service quality from providers and safety concerns. Further research is needed to address consumer apprehensions that influence their ongoing intention to use these systems (Chen et al., 2022).

As users are encouraged to embrace smart home systems, it becomes imperative for scholars to investigate user attitudes and behaviors subsequent to their initial adoption of such systems, in order to effectively support providers in expanding and optimizing their services (Kim & Lee, 2019). The acceptance of smart homes, as noted by Raza et al. (2019), is influenced by users' perceptions of usefulness and ease of use. The concept of perceived usefulness was introduced by Davis in his TAM (technology acceptance model) denoting users' ability to increase the performance by utilizing an improved system, which in turn reflects their willingness to embrace the technology (Raza et al., 2019; Chen et al., 202).

Empirical evidence has demonstrated the substantial and positive impact of perceived usefulness on initial user interest in adopting smart home services. Conversely, user satisfaction levels and usage patterns mediate the relationship between perceived effectiveness and the propensity to sustain the use of these services. A higher level of perceived usefulness contributes to increased user satisfaction with smart home service providers (Ghasemhani et al., 2022), primarily manifesting as positive emotional responses to systems that enhance productivity or performance (Liu et al., 2021). In turn, users' recognition of these systems' beneficial functions heightens their satisfaction and inclination to use them (Kim et al., 2021).

Furthermore, as revealed by several studies, habit formation can be influenced by external factors like cognitive misperceptions (Wang et al., 2021), psychological commitment and uncertainty with users' perceptions of a system's utility facilitating habit formation. The attitude of consumers towards technology plays a crucial role in determining their intent to adopt smart homes, as highlighted by Ozturk and Bicen's (2018) findings. Subsequent research grounded in technology adoption theory has identified various variables that impact technology usage intentions, revealing both positive and negative effects of technology perceptions. This expansion has led to the development of new research frameworks. Notably, Kim et al. (2007) proposed that the adoption of technology is driven by maximizing its value, and the adopters' perception of this value influences their behavior. They articulated the technology adoption process through the concept of perceived value, which takes into account both the sacrifices (such as technical complexity and perceived costs) and benefits (like usefulness and enjoyment) associated with using technology (Jung & Kim, 2021; Shim et al., 2021).

Despite the innovative features and practical advantages of smart homes, several factors impede their widespread adoption. The intention to use these technologies is influenced by perceived drawbacks, including complex usability, financial burden, uncertainty about control, and awareness of security risks. In the domain of energy management, research by Paetz et al. (2012) revealed the potential of smart home technology services to curtail residential energy consumption. Their study looked at a smart home scenario that integrated variable electricity pricing, smartmeters, and household appliances with the smart home system, increasing household energy efficiency and reducing consumption. Subsequent findings by Ringel et al. (2019) revealed that the anticipated energy savings achievable through smart home energy management technology, highlighting significant benefits across economic, social, and environmental spheres.

Additionally, the aspect of security surveillance and threat detection technology in smart homes has been emphasized by Dahmen et al. (2017) , Pandya et al. (2018), aiming to ensure the safety of both property and residents. From an ecological standpoint, this consumption pattern involves the buying of products characterized by energy efficiency, organic composition, or minimal environmental impact. With regard to residential sustainability, smart technology adoption is pivotal in modifying household behaviors, ultimately reducing the ecological footprint of homes (Pandya et al., 2018; Choudhary et al., 2021). Consequently, researchers, marketers, and policymakers have become increasingly interested in promoting the adoption of technologies that facilitate sustainable household behaviors, particularly in terms of energy efficiency (Kim & Lee, 2019).

Prior research has predominantly employed quantitative approaches such as structural equation modeling (Chen et al., 2019). However, the academic landscape is evolving to incorporate a mixed research approach that combines both qualitative research and quantitative research methodologies. Factors such as performance expectations, social influence, and habits have been found to be motivators for adoption of smart home technologies, the challenges identified were privacy and safety. Recent research has investigated the potential of energy-saving smart homes in contributing to environmental sustainability (Lee et al., 2020). For instance, Schill et al. (2018) studied about the moderating influence of the construct materialism on the relationship between environmental concern and the desire to buy smart home products, as gauged by achievement and satisfaction. The aspects of concern and aspiration towards smart home product acquisition were rooted in their perceived success and satisfaction levels.

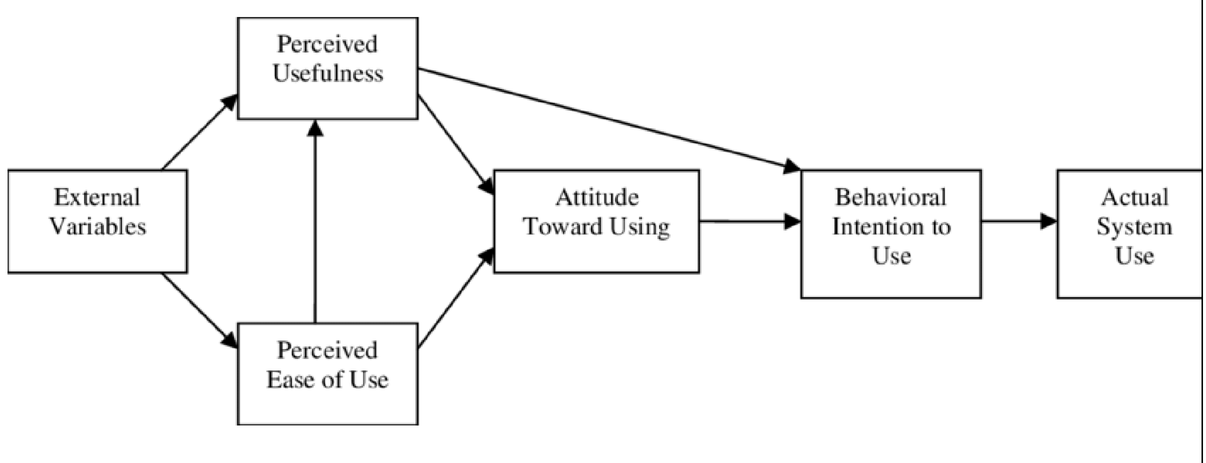

Figure 1 - Technology Acceptance Model (TAM)
Source - Technology Acceptance Model (Davis 1989)

Davis (1989) came up with the Technology Acceptance model (TAM). It is customised for the acceptance of computer technologies. It states that two key beliefs viz., perceived usefulness and perceived ease of use are pivotal for the acceptance of technologies. (Robin Nunkoo, T. D. Juwaheer and Tekranee Rambhunjun 2013) TAM was extended to add other factors which affects customers' attitude and buying intention by various technologies. Considering the evolving nature of Smart Home technologies and application of Artificial Intelligence (AI) and Internet of Things (IoT), many other factors need to be added to the list to understand what really influence customers' buying behaviour. Several researchers studied the adoption and acceptance of smart home technologies and concluded different factors which influence customers' buying intention. Legris et al. (2003) pointed out that it is essential to extend TAM as per the technology. Different technologies has different uses and customer perception differs from technology to technology.

Wenqing Zhang, Liangliang Liu (2022) confirmed that Perceived Usefulness and Ease of Use are major factors in adoption of Smart Homes. However, they extended the list to add knowledge, and environmental consciousness, which significantly influence the customer adoption.

Privacy is one of the important factors. Smart home appliances are going to gather a lot of personal information. Daily routines, food habits, health condition to name a few. As all devices are connected to the internet, there is a possibility of data theft. Alison, David and Richael (2018) discussed health monitoring and privacy as an important factor. Eva-Maria Schomakers, Hannah Biermann, Martina Ziefle (2021) also researched privacy and trust as determinants of customer preferences and found it influential factors. Nazmiye Balta-Ozkan, (2014) pointed that customers are afraid of personal data falling into wrong hands.

Purchase decisions are often influenced by Reference Groups. Emilie Vrain, Charlie Wilson (2021) in their study, studied the influence of social groups and communication behaviour of adopters and non-adopters as an important factor. Sharef, B. (2022) stated that convenience is the most critical factor followed by accessibility. Customisation and ability to control appliances remotely leads to convenience. Kang, H.J.,Han, J., Kwon, G.H. (2022) used Unified Theory of Acceptance and use of Technology (UTAUT) model to research factors leading to acceptance behaviour with regard to smart homes and concluded that users' perceptions on performance expectancy, effort expectancy, social influence, and functional conditions influence the purchase intention of the customer.

Growing **environmental awareness** also affects the customer buying intention. Customers are adopting environment friendly products. Marie Schilla, Delphine Godefroit-

Winkelb, Mbaye Fall Dialloc, Camilla Barbarossad (2019) concludes that **environmental concerns** and perceived usefulness affect the customer intention to buy smart home objects. Laura Ferreira, Tiago Oliveira, Catarina Neves (2022) also researched on role of **environmental awareness** in framing customers' intention to use and recommend smart homes.

Min Jee Nikki Hana, Mi Jeong Kima, In Han Kimb (2019) studied perception of users of smart home appliances and concluded that most of the users are not happy because lack of instruction manuals and guidance at initial stage. Acceptability of the technology also differs in **generations**, **age groups** and **genders**. Artificial Intelligence and Internet of things seems to have more influence on youth that elder generations. Bonnie Canziani, Sara MacSween (2021) found **gender and generation** are influential factors determining customer intension in buying smart home products. Jungwoo Shina, Yuri Parkb, Daeho Leec, (2018) also probed the demographic factors such as age, gender, education and income as an extension to TAM.

Any new technology comes with a perceived risk and security concerns. Smart homes are exposed to many security concerns. Its connection to internet may expose it to the hacking and data theft. Viruses, trojans and ransomwares can be potential threats to smart homes, which my result into threat to life and privacy. Jane E. Klobas, Tanya McGill, Xuequn Wang (2019) in their study revealed that security **risk** influences the customer intention to buy smart home products.

Ahmed Shuhaiber, Ibrahim Mashal, (2019) also pointed that perceived risk negatively affects customer adoption.

As discussed above, researchers studied and concluded different factors influences customer intention towards smart homes. O. Ayan and B. Türkay (2021) studied thirteen factors. Though all researchers are agreed on need of extension of TAM for its application to smart homes technologies, all of them differs in concluding factors influencing customer intention. This research aims to study all these factors and find out what matters the most to the customer while buying smart home technologies and build a comprehensive extended TAM. Based on research done by previous researchers, this research considers twelve factors to build comprehensive TAM. Considered factors are Perceived usefulness, Ease of use, Knowledge, Environmental concerns and awareness, Privacy and Trust, Social groups, Convenience, Accessibility, Performance expectancy, and Security.

Empirical research was conducted in India to understand what affects customers buying intention towards Artificial Intelligence and Internet of Things enabled Smart Homes. A survey was conducted with the help of structured questionnaire with seven pointer Likert scale.

Clustered sampling was used. The survey was responded by the 392 respondents from five administrative regions of India. The structural equation modelling was applied using SmartPLS to understand relationship between variables. Table 1 shows the references from where variables has been drawn and questions are used to collect the data.

Table 1. Citation, Factors and Questions

Citation	Factor	No	Questions
Davis (1989).	Perceived Usefulness	1	Smart Home will enable me to accomplish tasks more quickly.
		2	Smart Home will improve performance in my home.
		3	The smart home will increase my productivity
		4	The Smart home would enhance my effectiveness in my home
		5	Smart home would make it easier to do my task in my home.
		6	Smart home devices are useful
Davis (1989).	Ease of Use	1	Learning to operate smart home devices would be easy for me
		2	I would find it easy to get Smart home devices to do what I o do
		3	My interaction with smart home devices would be clear and ındable
		4	I would find a smart home to be flexible to interact with
		5	It would be easy for me to become skillful at using Smart evices.
		6	I would find Smart home devices easy to use.
Sharef, B. (2022)	Convenience	1	Smart home devices are convenient because I can use them at e.
		2	Smart homes are convenient because I can remotely control ppliances.
		3	Smart homes are convenient because they are easy to operate
Davis (1989).	Attitude	1	I think using Smart home devices is a good idea.
		2	I would have positive feelings toward Smart homes in general.
		3	It is a wise idea to use Smart home, as opposed to other .
Davis (1989).	Behavioral Intention to Use	1	I intend to use smart home devices.
		2	I predict that I would use smart home devices.
		3	I plan to use smart home devices.
Jane E. Klobas, Tanya McGill, Xuequn Wang (2019)	Security	1	Smart home devices will enhance the security of my home

		2	I consider security an important feature of smart homes.
		3	Security features impact my purchase decision
Alison, David and Richael (2018) , Eva-Maria Schomakers, Hannah Biermann, Martina Ziefle (2021)	Privacy	1	ome devices will not be a threat to my privacy
		2	l data will be safe with smart home devices
		3	ler privacy as an important feature affecting my purchase n.
Wenqing Zhang, Liangliang Liu (2022), Marie Schilla, Delphine Godefroit-Winkelb, Mbaye Fall Dialloc, Camilla Barbarossad (2019)	Environmental Concerns	1	mental awareness and concerns motivate me to buy smart home
		2	ome devices will enhance energy efficiency.
		3	ıome devices will reduce the environmental impact.
Emilie Vrain, Charlie Wilson (2021)	Social Groups	1	er the opinions of my family members, friends, and colleagues ıying appliances.
		2	ily members, friends, and colleagues' experiences with smart evices will impact my purchase decision.
		3	nsider reviews of other social groups while buying smart home
Wenqing Zhang, Liangliang Liu (2022)	Knowledge of Technologies	1	ll aware of smart home technologies
		2	are of the application of Artificial Intelligence and the Internet s in the smart home.
		3	dge of technologies impact my purchase decisions.
Sharef, B. (2022)	Accessibility	1	ome devices are available and easily accessible to me
		2	omes devices are affordable and accessible to me

		3	bility impacts my purchase decision.
Kang, H.J., Han, J., Kwon, G.H.(2022)	Performance Expectancy	1	d performance of smart home devices impact my buying n.
		2	fast and uninterrupted performance of smart home devices.
		3	mart home devices are durable and will perform better.
Source: Secondary data – Authors creation			

3 METHODOLOGY

The data has been collected from Indian customers with the help of structured questionnaire with seven pointer scale covering above questions. 385 respondents from across the India responded the survey. The collected data has been tested for reliability and then structural equation modelling has been applied. A model has been built on the basis of above factors drawn from literature review. The following model shows relationship between variables. The model has been tested with structured equation modelling using SmartPLS.

4 RESULTS

Structural Model

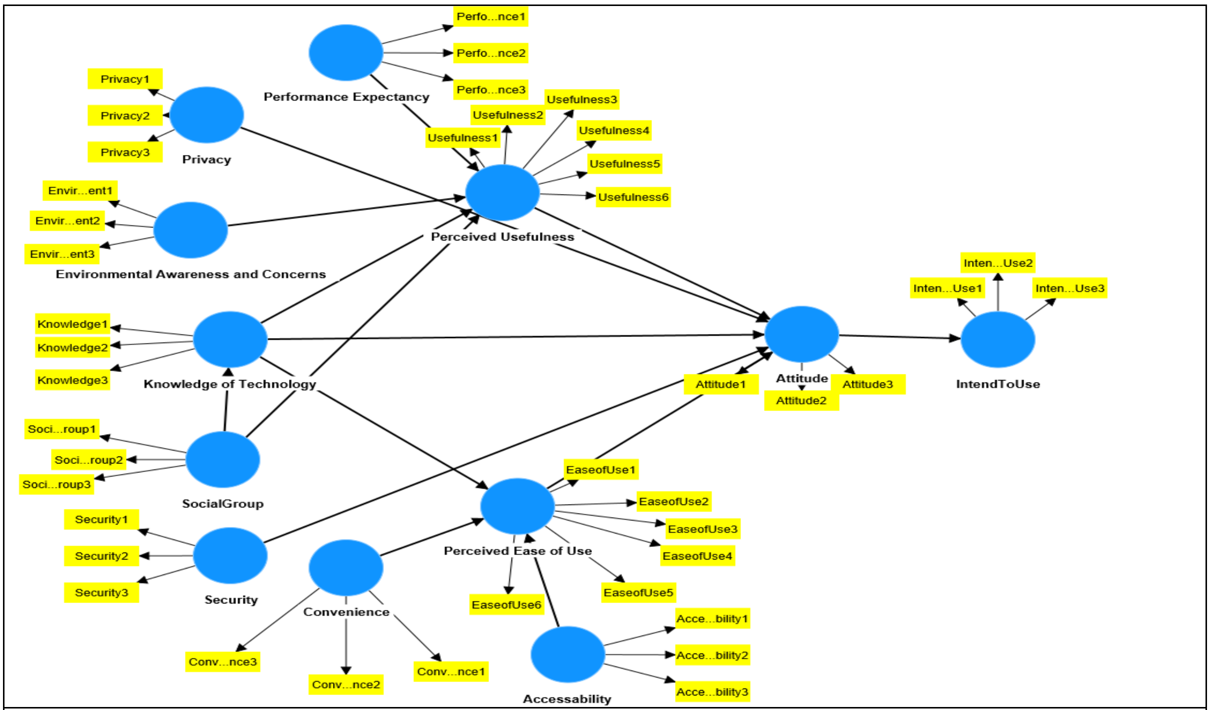

Figure 2 – Structural Model
Source: Primary data processed – Authors creation

The model proposes extension to existing technology acceptance model for acceptance of smart homes in India. Perceived Ease of Use and Perceived Usefulness mould the consumer attitude, which leads to intend to use the technology. As per the above model, Convenience and Accessibility build positive perception for Ease of use. Performance expectancy, Privacy, Environmental awareness and concerns, Knowledge of the technology and Social groups build perception towards usefulness of the technology. Security and Knowledge of the technology also impacts customer attitude towards the technology.

Testing the constructs' reliability and validity before establishing a relationship between variables. (Chiu and Wang 2008). The reliability of the constructs is established by Cronbach's alpha values and composite reliability coefficients (Fornell and Larcker 1981).

The reliability of the study can be understood with the help of Table 2. Cronbach's alpha for factors accessibility, attitude, convenience, environmental awareness and concerns, intention to use, technology knowledge, perceived ease of use, performance expectancy and social groups are above 0.9. Cronbach's alpha value for privacy and security is above 0.8, which is good to accept the reliability of the study.

Table 2. Reliability

	Cronbach's alpha	**Composite reliability (rho_a)**	**Composite reliability (rho_c)**	**Average variance extracted (AVE)**
Accessibility	0.943	0.959	0.964	0.898
Attitude	0.957	0.958	0.972	0.921
Convenience	0.959	0.959	0.974	0.925
Environmental Awareness and Concerns	0.918	0.919	0.948	0.859
Intend to Use	0.951	0.951	0.968	0.91
Knowledge of Technology	0.94	0.941	0.962	0.893
Perceived Ease of Use	0.976	0.977	0.98	0.893
Perceived Usefulness	0.979	0.98	0.983	0.907
Performance Expectancy	0.945	0.948	0.964	0.9
Privacy	0.824	0.858	0.893	0.737
Security	0.888	0.894	0.931	0.818
Social Group	0.96	0.964	0.974	0.925
Source: primary data processed				

STRUCTURAL MODEL ANALYSIS

Table 3. Path Coefficients

Relationship	Original sample (O)	Sample mean (M)	Standard deviation (STDEV)	T statistics (|O/STDEV|)	P values
Accessibility -> Perceived Ease of Use	0.097	0.099	0.036	2.706	0.007
Attitude -> Intent to Use	0.943	0.943	0.007	134.210	0.000
Convenience -> Perceived Ease of Use	0.658	0.650	0.061	10.721	0.000
Environmental Awareness and Concerns -> Perceived Usefulness	0.516	0.513	0.063	8.236	0.000
Knowledge of Technology -> Attitude	0.081	0.085	0.053	1.520	0.129
Knowledge of Technology -> Perceived Ease of Use	0.203	0.210	0.049	4.164	0.000
Knowledge of Technology -> Perceived Usefulness	0.391	0.393	0.100	3.915	0.000
Perceived Ease of Use -> Attitude	0.422	0.415	0.055	7.736	0.000
Perceived Usefulness -> Attitude	0.175	0.172	0.028	6.338	0.000
Performance Expectancy -> Perceived Usefulness	0.345	0.350	0.042	8.176	0.000
Privacy -> Attitude	0.133	0.130	0.032	4.180	0.000
Security -> Attitude	0.216	0.223	0.057	3.780	0.000
Social Group -> Knowledge of Technology	0.931	0.931	0.009	107.391	0.000
Social Group -> Perceived Usefulness	-0.362	-0.366	0.099	3.664	0.000
Source: primary data processed					

P value for Accessibility -> Perceived Ease of Use is 0.007, which is less than 0.5%, so the correlation between Accessibility and the Perceived Ease of Use is established. Accessibility impacts Perceived ease of use. P value for Attitude -> Intent to Use is 0.000, which is less than 0.5%, hence the correlation between Attitude and Intend to Use is established. It already a well-established that Attitude affect customers' intention to use to the technology. P value for Convenience -> Perceived Ease of Use is 0.000, is less than 0.5 %. Hence, the correlation between Convenience and Perceived Ease of Use is established. P value for

Environmental Awareness and Concerns -> Perceived Usefulness is 0.000, which is less than 0.5%, hence the correlation between Environmental Awareness and Concerns and Perceived Usefulness is established. P value for Knowledge of Technology -> Attitude is 0.129, which is less than 0.5%, hence the correlation between Knowledge of Technology and Attitude is established. P value for Knowledge of Technology -> Perceived Ease of Use is 0.000, which is less than 0.5%, hence the correlation between Knowledge of Technology and Perceived Ease of Use is established. Knowledge of Technology -> Perceived Usefulness also has P value of 0.000, which is less than 0.5 %, which results in acceptance of the correlation between Knowledge of the technology and Perceived Usefulness.

P value for Perceived Ease of Use -> Attitude, Perceived Usefulness -> Attitude, Performance Expectancy -> Perceived Usefulness, Privacy -> Attitude, Security -> Attitude, Social Group -> Knowledge of Technology and Social Group -> Perceived Usefulness is 0.000, which is less than 0.5 %, hence correlation between these construct is established.

5 DISCUSSION

Acceptance of smart home technologies is affected by many factors. Hence, the technology acceptance model needs to be extended to Smart home technologies. Privacy, Security and Knowledge of the technologies plays vital role in acceptance the smart homes. Accessibility and Convenience has its impact on Perceived Ease of Use. Performance expectancy, Knowledge of the technology, Social Groups and Environmental awareness and concerns impacts Perceived usefulness of smart homes. Knowledge of the technology, Privacy and Security has direct impact on customer attitude towards smart homes. The extended model incorporates privacy and security, which is studied by other researchers as an important elements forming customer attitude towards smart home technologies. However, consumer behaviour may change from country to country.

6 MANAGERIAL IMPLICATIONS

1. Enhancing perceived usefulness: Smart home companies should focus on highlighting the practical benefits and advantages of IoT and AI-enabled smart home technologies to potential customers. Emphasize features such as energy efficiency, security enhancements, convenience, and cost savings to increase the perceived usefulness of these technologies.

2. Addressing privacy and security concerns: One of the key barriers to IoT and AI adoption is customers' concerns about privacy and security. Managers should invest in robust security measures and transparent data privacy policies to build trust with customers. Clear communication about how customer data is collected, stored, and used is essential to alleviate privacy concerns and encourage acceptance.

3. User-friendly interface and simplicity: Designing user-friendly interfaces and ensuring simplicity in interacting with IoT and AI-enabled smart home devices is crucial. Managers should prioritize intuitive user interfaces, easy setup processes, and seamless integration with existing devices to reduce complexity and make technology adoption more accessible to customers.

4. Educating and training customers: Many potential customers may not be fully aware of the capabilities and benefits of IoT and AI-enabled smart home technologies. Managers should invest in educational programs and provide training materials to help customers understand the features and functionalities of these technologies. Demonstrating real-life use cases and conducting workshops can effectively enhance customers' knowledge and acceptance.

5. Customization and personalization: Smart homes should offer customization options to cater to individual preferences and needs. Managers should provide flexibility in system configurations, allowing users to adapt and personalize the technology according to their lifestyles. This customization aspect can significantly increase the perceived value of IoT and AI-enabled smart home solutions.

6. Affordable pricing and financing options: Affordability is a critical factor influencing technology adoption. Managers should explore competitive pricing strategies and consider offering financing options to make IoT and AI-enabled smart homes more accessible to a wider customer base. Collaborating with financial institutions to provide affordable installment plans or leasing options can facilitate adoption.

7. Leveraging social influence: Social influence plays a significant role in technology adoption. Managers should focus on leveraging influencers, industry experts, and early adopters to create awareness and generate positive word-of-mouth. Collaborations with popular influencers or partnerships with community leaders can help build trust and credibility among potential customers.

8. After-sales service and Support: Providing excellent after-sales service and customer support is prerequisite for sustained acceptance. Managers should establish a responsive and knowledgeable customer service team that can assist customers with technical

issues, troubleshooting, and upgrades. A positive customer support experience can enhance overall satisfaction and encourage long-term adoption.

7 CONCLUSION

Acceptance of smart home technologies is driven by many factors. Hence, technology acceptance model needs extension. This study reveals that privacy, security and knowledge of technology are additional factors to technology acceptance model which foster building favourable customer attitude towards smart home technologies. The study also found that there are some latent variable like convenience, accessibility which forms part of the construct of Perceived Ease of Use and performance expectancy, environmental awareness and concerns, social groups forms Perceived Usefulness of Smart home technologies.

This research will be helpful to smart home devices manufacturers and sellers to understand their customers. Further research can be conducted in this area covering the larger population.

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