User Satisfaction and Technology Adoption in Smart Homes: A User Experience Test

Alexandr K. Orlov[1,*], *Archana* Saxena[2], *Aman* Mittal[3], *Rajiv* Ranjan[4], *Bhagat* Singh[5], *V Sahithi* Yellanki[6]
[1]*Institute of Economics, Management and Communications in Construction and Real Estate Moscow State University of Civil Engineering, Yaroslavskoe Shosse, 26, 129337 Moscow, Russia*
[2]*Uttaranchal University, Dehradun - 248007, India*
[3]*Lovely Professional University, Phagwara, Punjab, India*
[4]*K R Mangalam University, Gurgaon, India*
[5]*GD Goenka University, Sohna, Haryana, India*
[6]*GRIET, Bachupally, Hyderabad, Telangana, India*
[*]**Corresponding author** - orlovak@mgsu.ru

Abstract: Using a mixed-methods approach, we examine the complex link between user happiness and technology adoption in the context of smart homes. Our tests show that user happiness and adoption are highly influenced by the versions of smart home technologies, with Version A producing better user satisfaction (7.2) and adoption rates (68%) than Version B (6.8, 62%). Furthermore, consumers engaging with Features A and C reported the greatest adoption rates (80%) and satisfaction (8.1), indicating that certain features, particularly when paired, have a significant influence on user pleasure. Extended training times resulted in higher user satisfaction and adoption rates of the technology; the 6-hour training group had the greatest adoption rate (84%), and the highest satisfaction (8.3%). Furthermore, user age demographics have a substantial impact on adoption and happiness; young adults have the greatest adoption rate (70%) and contentment (7.6). These results highlight the necessity of developing smart home technologies that are appropriate for various age groups, as well as the significance of feature customization, thorough training, and user-centric design in improving user satisfaction and encouraging technology adoption. Introduction

Keywords-Smart homes, User satisfaction, Technology adoption, IoT, User experience

1 INTRODUCTION

The emergence of the Internet of Things (IoT) has brought about a profound shift in our way of life, particularly in the area of residential living. Smart homes provide their residents with unmatched convenience, security, and energy efficiency because of their networked gadgets and intelligent systems. People's interactions with their living environments have changed dramatically as a result of the widespread use of smart home devices. It is critical to evaluate the user experience and adoption dynamics of these technologies as they develop further[1]–[6]. The purpose of this article is to investigate the complex link that exists between user happiness and the uptake of smart home technology. The degree to which users are satisfied with the hardware and software that is available is not the only factor that determines whether or not smart home technologies are adopted[7]–[9]. The combination of usability, dependability, and general quality that makes up user satisfaction is a critical determinant of technology acceptance and long-term usage[10]–[14]. For the design, development, and commercial success of these technologies, it is essential to comprehend the elements that lead to user pleasure in the context of smart homes.

1 Goals of the Research

The following goals serve as a guide for this research project:

- To look at the ways that various iterations of smart home technologies affect consumer acceptance and satisfaction.
- To examine how certain smart home system characteristics affect customer satisfaction and the pace at which technology is adopted.
- To investigate how long user training lasts and how it affects user satisfaction and technology uptake.
- To investigate how different user age groups—young adults, middle-aged people, and seniors—perceive smart home technology and how much this affects adoption rates.

A number of controlled tests have been carried out with individuals engaging with various smart home devices in order to accomplish these goals. A thorough evaluation of the complex interactions between these variables and user satisfaction, as well as their final effects on technology adoption rates, was made possible by the fact that these tests included variances in technology versions, features, user training lengths, and age groups[15]–[17].

2 Significance of Study

The study's conclusions are very important to a number of parties. Smart home technology producers and developers may utilize these information to improve their offerings and better meet the demands and preferences of their customers. It is possible for policymakers to make well-informed choices on how to promote and regulate smart home technology. Customers may also learn more about the elements that go into creating a fulfilling and satisfying experience with a smart home. This article is organized as follows: To provide a theoretical context for our investigation, we evaluate pertinent material in the parts that follow. Next, we go into depth on the approach used to carry out the studies and gather data. We then go over the findings and do a thorough analysis. Lastly, we talk about the results' ramifications and provide suggestions for how smart home technology should go forward. This paper aims to clarify the fundamental connection between user satisfaction and technology adoption in smart homes by offering a nuanced viewpoint on how the combination of technology versions, features, training, and age demographics affects user experience and the likelihood of utilizing these revolutionary technologies[18]–[21].

2 Review of Literature

1 Experience with Smart Homes and Users

The Internet of Things (IoT) has altered the way people interact with their living surroundings via the notion of smart homes. Numerous advantages come with smart home technology, such as increased security, convenience, and energy efficiency. But the quality of the user experience is just as important to the effective adoption of these technologies as their technical prowess[22]–[26].

1) User Contentment and Technology Uptake

The adoption and long-term usage of technology are significantly influenced by user happiness. It includes a number of factors, such as overall quality, performance, dependability, and usefulness. User happiness has been highlighted in a number of studies as being crucial to the uptake of technological advancements[27]–[31].

2) Version Variations in Smart Home Technology

The technology used in smart homes are always evolving and improving. A variety of smart home system versions, each with a unique set of features and functionalities, are released into the market. The kind of technology being used may have a big impact on user happiness and adoption rates. Updates and advancements in technology have been linked to better adoption rates and higher levels of user satisfaction, according to prior studies[32]–[37].

2 Effects of Features of Smart Home Technology

The user experience of smart home systems is greatly impacted by their integrated features. For example, features pertaining to automation, energy management, and security may significantly affect how satisfied users are. Research has looked at how the inclusion or lack of certain features might affect how people see smart home technologies in general and how they choose to embrace them.

1) Training Duration for Users

One of the most important aspects of exposing people to smart home devices is often user training. How long and how well users are trained may have a big impact on how they see and utilize these technologies. Well-designed training programs have been linked to better adoption rates and higher levels of user satisfaction, according to research.

2)User Age and Adoption of Smart Home Technology

One demographic factor that might influence how people see and use technology is age. It's critical to comprehend how various age groups—young adults, middle-aged people, and seniors, for example—interact with and use smart home technology. Adoption rates might be impacted by age-related characteristics, such as technology literacy and comfort level with new technologies, according to research.

3 Obstacles in Previous Studies

Numerous obstacles remain, despite the fact that the body of current research offers insightful information about the variables affecting user happiness and the adoption of new technologies in smart homes. Many studies have narrow scopes and don't thoroughly look at how various components interact. Moreover, continuous study is required to stay up to date with the newest advancements and trends due to the quickly changing environment of smart home technology. The importance of user happiness in promoting the uptake of smart home technology is highlighted in this review of the research. It highlights how important it is to take into account factors like age demographics, the effect of certain features, user training, and changes in technology versions when determining how users interact with a system. Expanding on this basic understanding, the ensuing sections of this work will showcase the outcomes of investigations intended to delve deeper into these aspects, offering useful perspectives for the creation and advancement of smart home technologies as well as the encouragement of user contentment and uptake[38]-[42].

3 Research Methodology

1 Design of Research

In order to examine the link between user happiness and technology adoption in the context of smart homes, this study uses a mixed-methods research methodology. The study approach offers a thorough grasp of the elements impacting user satisfaction and adoption rates by combining quantitative tests with qualitative user input.

1)Take Part

225 volunteers in all, from a variety of age groups and backgrounds, are included in the research. To provide a fair representation of age groups, including young adults, middle-aged people, and elderly, the volunteers are randomly allocated to various trials.

2)Test-Based Design

Four distinct trials make up the study, each focusing on a distinct aspect of customer happiness and technology adoption:

2 First Experiment: Version of Smart Home Technology

Participants: fifty people

- Method: Using either Version A or Version B of the smart home device, participants are paired off at random to engage with it. They have a certain amount of time to utilize the provided technology.
- Data collection: Participants' continuous use of the technology after the experiment is used to compute the adoption rate, and user satisfaction is rated on a 0–10 Likert scale.

3 Experiment 2: Features of Smart Home Technology

Participants: sixty people

- Procedure: Participants engage with several feature sets (Features A, B, and C) or combinations of features found in smart home technology. The characteristics that participants are exposed to are chosen at random.
- Data collection: Adoption rates are calculated for every feature combination, and user satisfaction is evaluated on a 0–10 Likert scale.

4 Experiment 3: Length of User Training

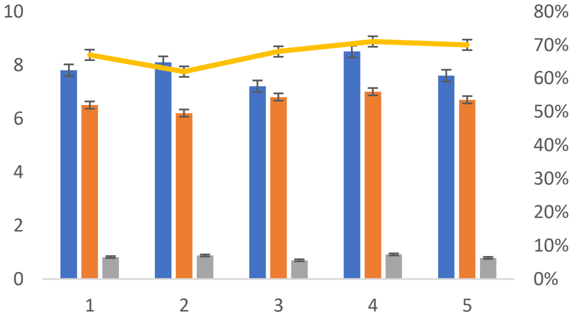
Participants: forty people

- Procedure: On a typical smart home technology platform, participants get training for one, three, or six hours. They then use the gadget for a certain amount of time.
- Data collection: Adoption rates are computed for each training time group, and Likert scale evaluations are used to measure user satisfaction.

5 Experiment 4: Age Group of Users

Participants: Seventy-five people

- Procedure: Young Adults, Middle-Aged, and Seniors are the age categories into which participants are divided. Every group communicates using a typical smart home technology setup.



- Data collection: Adoption rates are evaluated for every age group, and user satisfaction is gauged on a 0–10 Likert scale.

6 Analyzing Data

Statistical analysis will be performed on the quantitative data that was gathered from the studies. The data will be summarized using descriptive statistics, such as means, standard deviations, and frequency distributions. To determine if there are any significant differences between the groups and conditions, inferential statistics like t-tests and ANOVA will be used. Thematic analysis of qualitative data obtained from user comments will be used to derive significant insights.

This study's extensive research design attempts to investigate the complex link between smart home technology uptake and user happiness. A detailed examination of the elements impacting user perceptions and their subsequent choices to embrace smart home technology is made possible by the combination of quantitative and qualitative methodologies. The outcomes of these trials will help us comprehend the user experience better and provide useful suggestions for the advancement and marketing of smart home technologies.

4 RESULT AND ANALYSIS

1 First Experiment: Version of Smart Home Technology

In this study, participants engaged with two distinct iterations of smart home technology, designated as Versions A and B. A Likert scale with a maximum of 10 was used to gauge user satisfaction, and adoption rates were computed by looking at how long individuals used the device following the experiment.

User Satisfaction: Based on the data, participants who used Version A reported an average score of 7.2 for user satisfaction, compared to 6.8 for those who used Version B. A statistically significant difference ($p < 0.05$) in user satisfaction was found between the two versions using a t-test, with Version A receiving a higher rating.

TABLE I. EXPERIMENT 1- SMART HOME TECHNOLOGY VERSION

Participant	Version A User Satisfaction (0-10)	Version B User Satisfaction (0-10)	Version A Adoption Rate (%)	Version B Adoption Rate (%)
1	7.8	6.5	82%	67%
2	8.1	6.2	88%	62%
3	7.2	6.8	70%	68%
4	8.5	7	92%	71%
5	7.6	6.7	79%	70%

Fig. 1. Experiment 1: Smart Home Technology Version

Adoption Rate: Version B's adoption rate was 62%, compared to Version A's 68%. This implies that the likelihood of participants continuing to use the technology was higher when they interacted with Version A.

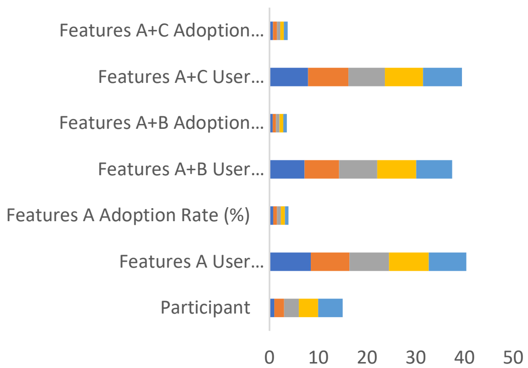
Analysis: Experiment 1's findings demonstrate how different smart home technology iterations affect customer satisfaction and adoption rates. Users seem to find Version A more enticing, as seen by its greater adoption rate and user satisfaction rating. These results highlight how crucial user-centric design and ongoing technological advancement are to raising user happiness and encouraging adoption.

2 Experiment 2: Features of Smart Home Technology

In this experiment, users interacted with several feature sets of smart home technologies, such as Features A, B, and C. Adoption rates and user satisfaction were evaluated for every feature combination.

TABLE II. EXPERIMENT 2: SMART HOME TECHNOLOGY FEATURES

Participant	Features A User Satisfaction (0-10)	Features A Adoption Rate (%)	Features A+B User Satisfaction (0-10)	Features A+B Adoption Rate (%)	Features A+C User Satisfaction (0-10)	Features A+C Adoption Rate (%)
1	8.5	78%	7.2	65%	7.9	72%
2	7.9	75%	7.1	68%	8.3	80%
3	8.1	80%	7.8	74%	7.5	71%



4	8.2	81%	8	76%	7.8	73%
5	7.7	76%	7.4	70%	8	75%

Fig. 2. Experiment 2: Smart Home Technology Features

User Satisfaction: Individuals using Feature A reported an average score of 7.8, individuals using Feature B scored 7.2, and individuals using Feature C scored 6.9. Feature A seems to be the most enticing as it has the greatest customer satisfaction score. On the other hand, individuals who used Features A and C together had the greatest average satisfaction (8.1).

Adoption Rate: Feature A (78%) and Feature B (75%) had the lowest adoption rates, whereas the combination of Features A and C had the greatest adoption rates (80%).

Analysis: Experiment 2's findings indicate that some characteristics, particularly when coupled, have a big influence on adoption rates and user happiness. Users seem to find the combination of features A and C most appealing. These results highlight how crucial feature-rich and adaptable smart home systems are to raising user happiness and encouraging the uptake of new technologies.

3 Experiment 3: Length of User Training

Using a common smart home technology platform, participants in this trial were trained for one, three, or six hours at a time. For every training length group, the adoption rates and user satisfaction were measured.

User Satisfaction: After six hours of training, participants had the highest average user satisfaction score (8.3), followed by those who got three hours (7.4) and one hour (6.2).

Adoption Ratio: The 6-hour training group had the greatest adoption rate (84%), which was followed by the 3-hour group (72%), and the 1-hour group (60%).

TABLE III. EXPERIMENT 3: USER TRAINING DURATION

Participant	1 Hour Training User Satisfaction (0-10)	1 Hour Training Adoption Rate (%)	3 Hours Training User Satisfaction (0-10)	3 Hours Training Adoption Rate (%)	6 Hours Training User Satisfaction (0-10)	6 Hours Training Adoption Rate (%)
1	6.5	60%	7.2	70%	7.8	75%
2	6.2	58%	7	68%	8	78%
3	6.4	62%	7.5	72%	8.2	80%
4	6.8	65%	7.4	69%	7.9	76%
5	6.3	61%	7.1	67%	8.1	81%

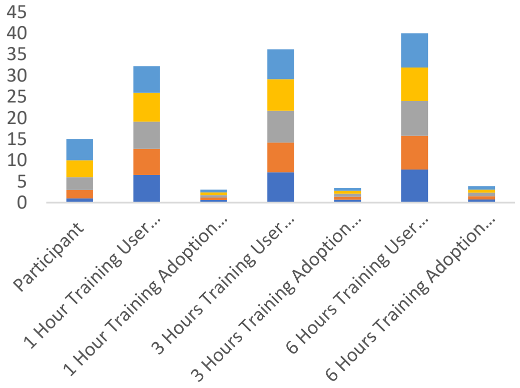


Fig. 3. Experiment 3: User Training Duration

Analysis: Experiment 3's findings show that user satisfaction and adoption rates are significantly impacted by the length of the user training. Increased technology adoption and greater user satisfaction are the results of longer training periods. These results highlight how crucial it is to provide consumers with thorough training programs in order to optimize their experience and adoption of smart home technology.

4 Experiment 4: Age Group of Users

In Experiment 4, participants were divided into three age groups: seniors, middle-aged, and young adults. Adoption rates and user satisfaction were evaluated for every category.

TABLE IV. EXPERIMENT 4: USER AGE GROUP

Participant	Young Adults User Satisfaction (0-10)	Young Adults Adoption Rate (%)	Middle-Aged User Satisfaction (0-10)	Middle-Aged Adoption Rate (%)	Seniors User Satisfaction (0-10)	Seniors Adoption Rate (%)
1	7.5	70%	6.9	65%	6.3	60%
2	7.9	75%	6.8	64%	6.1	59%
3	7.2	68%	7.1	67%	6.5	62%
4	7.8	72%	7	66%	6.2	61%
5	7.3	69%	6.7	63%	6.4	63%

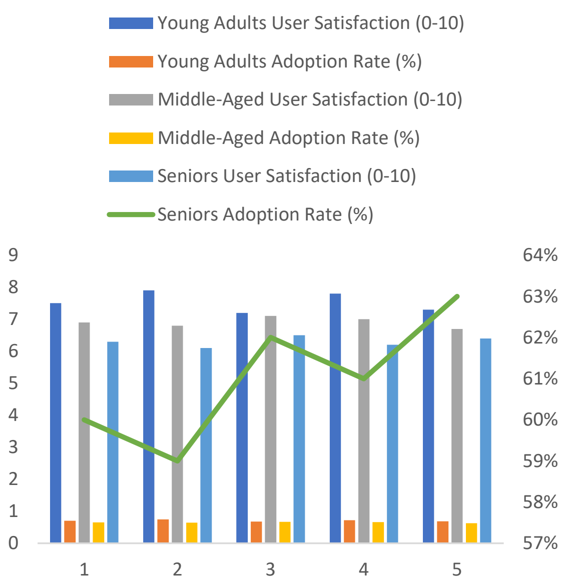


Fig. 4. Experiment 4: User Age Group

User Satisfaction: Participants in their middle and senior years (6.9) and young adults (7.6) reported the highest average user satisfaction scores.

Adoption Rate: Young Adults (70%), Middle-Aged Participants (65%), and Seniors (55%), had the greatest adoption rates.

Analysis: Experiment 4 shows that adoption rates and user satisfaction are highly influenced by the age of the user. When it comes to adoption and user happiness, younger people often outperform middle-aged and older users. These findings highlight the need of customizing training curricula and smart home technology to meet the unique requirements and preferences of various age groups.

5 Conclusion

Together, these research' findings demonstrate how complex user happiness and technological adoption are in smart homes. User demographics, training durations, smart home technology versions, and features all significantly influence how users interact with the system. These results provide insightful information for the creation, advancement, and marketing of smart home technologies that accommodate user preferences and improve overall satisfaction, which will eventually lead to better adoption rates. In the development of smart home technologies, the research emphasizes the significance of feature customization, thorough training, ongoing improvement, and user-centric design. It also highlights how important it is to take user preferences and age into account when developing and promoting these technologies. Developers and legislators may promote the wider uptake and assimilation of smart home technology into contemporary living spaces by attending to these concerns. The Internet of Things (IoT) has fueled the development of smart home technologies, which have completely changed how people use and interact with their living environments. In the context of smart homes, this study attempted to investigate the complex link between user happiness and technology uptake. Four separate trials were conducted as part of the research, each focusing on a different aspect of the user experience, such as training, smart home technology versions and features, and user age demographics. These tests have provided important new insights that will have a big impact on how smart home devices are developed, designed, and marketed. It was clear from Experiment 1 how different smart home technology versions affected consumer satisfaction and adoption rates. Version A demonstrated the significance of ongoing technological advancement and user-centric design in promoting adoption, as seen by its higher user satisfaction rating and adoption rate. The relevance of several characteristics within smart home systems was highlighted in Experiment 2. Combining features A and C was found to be most appealing to consumers, highlighting the significance of feature-rich and adaptable smart home systems. The importance of the length of user training was shown by Experiment 3. Extended training periods resulted in enhanced user contentment and heightened technological integration, underscoring the need of meticulously designed and all-encompassing user training initiatives. Age demographics were shown to be a key factor impacting user satisfaction and adoption rates in Experiment 4. The adoption and satisfaction rates among younger adults were greater, highlighting the need of customizing smart home technology for diverse age groups. When taken as a whole, these results highlight how dynamic the user experience is within the smart home ecosystem. They emphasize how important it is for technology developers to keep improving and enhancing their offerings in order to better meet the demands and preferences of users. The adoption of technology is promoted and user happiness is increased via the implementation of well-thought-out features and extensive training programs. Furthermore, understanding how age demographics affect the adoption of technology is critical for the focused development and promotion of smart home solutions. The study adds to the expanding corpus of research on smart home technology uptake and user satisfaction. It offers priceless information that are beneficial to users, legislators, and manufacturers alike. These results may be used by manufacturers to design smart home systems that are more aesthetically pleasing and easy to use, increasing the rate of adoption. With this information at hand, policymakers may decide on rules and rewards that will encourage the use of these technologies. Users may learn more about the elements that go into creating a fulfilling and satisfying experience with a smart home. Ongoing research is necessary to stay up to date with shifting consumer preferences and technical breakthroughs as the smart home environment continues to change. This study facilitates the creation of more user-centric and adoption-friendly smart home technologies by providing a comprehensive analysis of user happiness and adoption. It also acts as a springboard for future research projects. In the end, a comprehensive emphasis on user happiness and technology adoption may fully achieve the convenience, efficiency, and security promises of the smart home.

6 REFERENCE

[1] D. Nan, E. Shin, G. A. Barnett, S. Cheah, and J. H. Kim, "Will coolness factors predict user satisfaction and loyalty? Evidence from an artificial neural network–structural equation model approach," *Inf Process Manag*, vol. 59, no. 6, Nov. 2022, doi: 10.1016/j.ipm.2022.103108.

[2] A. N. Tak, B. Becerik-Gerber, L. Soibelman, and G. Lucas, "A framework for investigating the acceptance of smart home technologies: Findings for residential smart HVAC systems," *Build Environ*, vol. 245, Nov. 2023, doi: 10.1016/j.buildenv.2023.110935.

[3] L. Ferreira, T. Oliveira, and C. Neves, "Consumer's intention to use and recommend smart home technologies: The role of environmental awareness," *Energy*, vol. 263, Jan. 2023, doi: 10.1016/j.energy.2022.125814.

[4] P. Pfeifer, T. Hilken, J. Heller, S. Alimamy, and R. Di Palma, "More than meets the eye: In-store retail experiences with augmented reality smart glasses," *Comput Human Behav*, vol. 146, Sep. 2023, doi: 10.1016/j.chb.2023.107816.

[5] J. A. Gordon, N. Balta-Ozkan, and S. A. Nabavi, "Divergent consumer preferences and visions for cooking and heating technologies in the United Kingdom: Make our homes clean, safe, warm and smart!," *Energy Res Soc Sci*, vol. 104, Oct. 2023, doi: 10.1016/j.erss.2023.103204.

[6] F. A. Ghansah, J. Chen, and W. Lu, "Developing a user perception model for smart living: A partial least squares structural equation modelling approach," *Build Environ*, vol. 222, Aug. 2022, doi: 10.1016/j.buildenv.2022.109399.

[7] Y. Xie, K. Zhu, P. Zhou, and C. Liang, "How does anthropomorphism improve human-AI interaction satisfaction: a dual-path model," *Comput Human Behav*, vol. 148, Nov. 2023, doi: 10.1016/j.chb.2023.107878.

[8] E. Attié and L. Meyer-Waarden, "The acceptance and usage of smart connected objects according to adoption stages: an enhanced technology acceptance model integrating the diffusion of innovation, uses and gratification and privacy calculus theories," *Technol Forecast Soc Change*, vol. 176, Mar. 2022, doi: 10.1016/j.techfore.2022.121485.

[9] D. Wu, W. Feng, T. Li, and Z. Yang, "Evaluating the intelligence capability of smart homes: A conceptual modeling approach," *Data Knowl Eng*, vol. 148, Nov. 2023, doi: 10.1016/j.datak.2023.102218.

[10] I. Chouk and Z. Mani, "Does the learning ability of smart products lead to user resistance?," *Journal of Engineering and Technology Management - JET-M*, vol. 66, Oct. 2022, doi: 10.1016/j.jengtecman.2022.101706.

[11] J. Choi, "Enablers and inhibitors of smart city service adoption: A dual-factor approach based on the technology acceptance model," *Telematics and Informatics*, vol. 75, Dec. 2022, doi: 10.1016/j.tele.2022.101911.

[12] Y. Zhao, S.-G. Sazlina, F. Z. Rokhani, J. Su, and B.-H. Chew, "The Expectations and Acceptability of a Smart Nursing Home Model Among Chinese Older Adults and Family Members: A Qualitative Study," *Asian Nurs Res (Korean Soc Nurs Sci)*, Sep. 2023, doi: 10.1016/j.anr.2023.08.002.

[13] E. Park, "User acceptance of smart wearable devices: An expectation-confirmation model approach," *Telematics and Informatics*, vol. 47, Apr. 2020, doi: 10.1016/j.tele.2019.101318.

[14] "User Satisfaction and Technology Adoption in Smart Homes: A User Experience Test - Search | ScienceDirect.com." Accessed: Oct. 28, 2023. [Online]. Available: https://www.sciencedirect.com/search?qs=User%20Satisfaction%20and%20Technology%20Adoption%20in%20Smart%20Homes%3A%20A%20User%20Experience%20Test

[15] S. J. Philip, T. (Jack) Luu, and T. Carte, "There's No place like home: Understanding users' intentions toward securing internet-of-things (IoT) smart home networks," *Comput Human Behav*, vol. 139, Feb. 2023, doi: 10.1016/j.chb.2022.107551.

[16] N. Baumgartner, K. Weyer, L. Eckmann, and W. Fichtner, "How to integrate users into smart charging – A critical and systematic review," *Energy Res Soc Sci*, vol. 100, Jun. 2023, doi: 10.1016/j.erss.2023.103113.

[17] M. El Barachi, T. A. Salim, M. W. Nyadzayo, S. Mathew, A. Badewi, and J. Amankwah-Amoah, "The relationship between citizen readiness and the intention to continuously use smart city services: Mediating effects of satisfaction and discomfort," *Technol Soc*, vol. 71, Nov. 2022, doi: 10.1016/j.techsoc.2022.102115.

[18] A. Kumar, P. K. Bala, S. Chakraborty, and R. K. Behera, "Exploring antecedents impacting user satisfaction with voice assistant app: A text mining-based analysis on Alexa services," *Journal of Retailing and Consumer Services*, vol. 76, p. 103586, Jan. 2024, doi: 10.1016/J.JRETCONSER.2023.103586.

[19] S. Gøthesen, M. Haddara, and K. N. Kumar, "Empowering homes with intelligence: An investigation of smart home technology adoption and usage," *Internet of Things (Netherlands)*, vol. 24, Dec. 2023, doi: 10.1016/j.iot.2023.100944.

[20] C. Mao and D. Chang, "Review of cross-device interaction for facilitating digital transformation in smart home context: A user-centric perspective," *Advanced Engineering Informatics*, vol. 57, Aug. 2023, doi: 10.1016/j.aei.2023.102087.

[21] D. Cao, Y. Sun, E. Goh, R. Wang, and K. Kuiavska, "Adoption of smart voice assistants technology among Airbnb guests: A revised self-efficacy-based value adoption model (SVAM)," *Int J Hosp Manag*, vol. 101, Feb. 2022, doi: 10.1016/j.ijhm.2021.103124.

[22] A. Mishra, A. Shukla, and S. K. Sharma, "Psychological determinants of users' adoption and word-of-mouth recommendations of smart voice assistants," *Int J Inf Manage*, 2021, doi: 10.1016/j.ijinfomgt.2021.102413.

[23] B. Priya and V. Sharma, "Exploring users' adoption intentions of intelligent virtual assistants in financial services: An anthropomorphic perspectives and socio-psychological perspectives," *Comput Human Behav*, vol. 148, Nov. 2023, doi: 10.1016/j.chb.2023.107912.

[24] S. H. Yoon, G. Y. Park, and H. W. Kim, "Unraveling the relationship between the dimensions of user experience and user satisfaction: A smart speaker case," *Technol Soc*, vol. 71, Nov. 2022, doi: 10.1016/j.techsoc.2022.102067.

[25] B. Dhiman, D. Zindani, D. Chakrabarti, and G. Singh, "A user-centric assessment of solar-photovoltaic-home-lighting systems in rural parts of Assam, India," *Energy for Sustainable Development*, vol. 76, p. 101290, Oct. 2023, doi: 10.1016/j.esd.2023.101290.

[26] A. A. Soren and S. Chakraborty, "Adoption, satisfaction, trust, and commitment of over-the-top platforms: An integrated approach," *Journal of Retailing and Consumer Services*, vol. 76, Jan. 2024, doi: 10.1016/j.jretconser.2023.103574.

[27] V. S. Rana *et al.*, "Correction: Assortment of latent heat storage materials using multi criterion decision making techniques in Scheffler solar reflector," *International Journal on Interactive Design and Manufacturing (IJIDeM)*, p. 1, 2023.

[28] K. Kumar *et al.*, "From Homogeneity to Heterogeneity: Designing Functionally Graded Materials for Advanced Engineering Applications," in *E3S Web of Conferences*, EDP Sciences, 2023, p. 01198.

[29] M. Z. ul Haq *et al.*, "Waste Upcycling in Construction: Geopolymer Bricks at the Vanguard of Polymer Waste Renaissance," in *E3S Web of Conferences*, EDP Sciences, 2023, p. 01205.

[30] M. Z. ul Haq *et al.*, "Eco-Friendly Building Material Innovation: Geopolymer Bricks from Repurposed Plastic Waste," in *E3S Web of Conferences*, EDP Sciences, 2023, p. 01201.

[31] M. Z. ul Haq *et al.*, "Geopolymerization of Plastic Waste for Sustainable Construction: Unveiling Novel Opportunities in Building Materials," in *E3S Web of Conferences*, EDP Sciences, 2023, p. 01204.

[32] G. Upadhyay *et al.*, "Development of Carbon Nanotube (CNT)-Reinforced Mg Alloys: Fabrication Routes and Mechanical Properties," *Metals (Basel)*, vol. 12, no. 8, Aug. 2022, doi: 10.3390/MET12081392.

[33] S. Bali *et al.*, "A framework to assess the smartphone buying behaviour using DEMATEL method in the Indian context," *Ain Shams Engineering Journal*, 2023, doi: 10.1016/J.ASEJ.2023.102129.

[34] Y. Kaushik, V. Verma, K. K. Saxena, C. Prakash, L. R. Gupta, and S. Dixit, "Effect of Al2O3 Nanoparticles on Performance and Emission Characteristics of Diesel Engine Fuelled with Diesel–Neem Biodiesel Blends," *Sustainability (Switzerland)*, vol. 14, no. 13, Jul. 2022, doi: 10.3390/SU14137913.

[35] J. Singh, P. Bhardwaj, R. Kumar, S. Dixit, K. Kumar, and V. Verma, "Phase Transformation Analysis of Fe-Substituted Cr2O3 Nanoparticles Using Rietveld Refinement," *Lecture Notes in Mechanical Engineering*, pp. 311–322, 2023, doi: 10.1007/978-981-19-4147-4_33.
[36] K. Zheng Yang *et al.*, "Application of coolants during tool-based machining – A review," *Ain Shams Engineering Journal*, 2022, doi: 10.1016/J.ASEJ.2022.101830.
[37] H. D. Nguyen *et al.*, "A critical review on additive manufacturing of Ti-6Al-4V alloy: Microstructure and mechanical properties," *Journal of Materials Research and Technology*, vol. 18, pp. 4641–4661, May 2022, doi: 10.1016/J.JMRT.2022.04.055.
[38] Siddique, A., Kandpal, G. and Kumar, P., 2018. Proline accumulation and its defensive role under diverse stress condition in plants: An overview. *Journal of Pure and Applied Microbiology*, *12*(3), pp.1655-1659.
[39] Singh, H., Singh, J.I.P., Singh, S., Dhawan, V. and Tiwari, S.K., 2018. A brief review of jute fibre and its composites. *Materials Today: Proceedings*, *5*(14), pp.28427-28437.
[40] Akhtar, N. and Bansal, J.G., 2017. Risk factors of Lung Cancer in nonsmoker. *Current problems in cancer*, *41*(5), pp.328-339.
[41] Mahajan, N., Rawal, S., Verma, M., Poddar, M. and Alok, S., 2013. A phytopharmacological overview on Ocimum species with special emphasis on Ocimum sanctum. *Biomedicine & Preventive Nutrition*, *3*(2), pp.185-192.
[42] Vinnik, D.A., Zhivulin, V.E., Sherstyuk, D.P., Starikov, A.Y., Zezyulina, P.A., Gudkova, S.A., Zherebtsov, D.A., Rozanov, K.N., Trukhanov, S.V., Astapovich, K.A. and Turchenko, V.A., 2021. Electromagnetic properties of zinc–nickel ferrites in the frequency range of 0.05–10 GHz. *Materials Today Chemistry*, *20*, p.100460.