IMPACT OF AUGMENTED REALITY ON VISUAL AND AUDITORY SENSORY INFLUENCING SUSTAINABLE CONSUMPTION AMONG ONLINE SHOPPERS

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Abstract
This study aims to examine the impact of visual and auditory sensory stimuli through augmented technology on sustainable consumption behaviour among online shoppers in India. It investigates how sensory-driven augmented reality (AR) experiences influence consumer decision-making and long-term engagement with digital shopping platforms. An exploratory research design was adopted to analyse consumer behaviour in online product purchases using AR technologies. Primary data were collected from 175 Indian respondents, including educational professionals, researchers, parents, and students. A structured questionnaire with open/closed-ended questions and a five-point Likert scale was used. The sample size was calculated by Cochran's formula with a margin of error of 7.5% and 95% confidence level. The method of convenience sampling (non-probability method) was used. Data analysis was done with the help of the software (SPSS Version 22 & AMOS Version 22 software).The study reveals that visual and auditory sensory stimuli via augmented technology significantly influence consumer satisfaction, sustainable consumption behaviour, and trust in online retailers. Consumers exhibited a positive perception of virtual product experiences, and their brand interactions were enhanced through sensory-rich AR environments.

These findings provide valuable insights for researchers and practitioners aiming to improve digital commerce platforms. The study emphasises the importance of multisensory interaction in designing immersive consumer experiences and suggests future research into additional sensory dimensions such as olfactory and haptic feedback.

Keywords: Augmented Reality, Consumer Behaviour, Sustainable Consumption, Online Shopping, Audio-Visual Sensory Stimuli

1. INTRODUCTION

Augmented reality (AR) is a technology that overlays computer-generated images, sounds, or other sensory data onto a user's perception of the real world, enhancing their experience by blending digital content with their physical environment (Furht, B. 2011). Augmented reality makes it easier for an individual to perceive reality as the digital elements are incorporated in their surroundings in real-time (Dargan, S et al.,2023). This technology has a wide range of applications, ranging from gaming and entertainment to education and healthcare (Xiao-Yu Xu et al., 2024). The integration of the physical and digital worlds opens endless opportunities for innovation and creativity (Kumar, H. et al., 2023). Augmented reality for the online audio-visual sensory market will transform how companies interact with consumers (Rauschnabel, P. A. et al., 2022). Through this technology, businesses can create more interactive and engaging activities for potential customers who can try out their products or observe how the products will look in their space. In addition, auditory and visual sensory stimuli can help consumers imagine and relate to their products in ways that traditional products cannot (Chylinski, M. et al., 2020). Augmented reality can be employed to offer consumers a virtual shopping experience with their products before purchase. This technology will require consumers to immerse themselves to the best of their ability in the digital life, buying the products (Wedel, M et al., 2020). Augmented reality for using the AR technology for eco-friendly sensory shopping of products by online users promotes eco-friendly marketing, as users are provided an opportunity to view what their products would look like in their space (Du, Z et al.,2022). This helps many online consumers to buy the products to reduce the rate of pollution. With this technology, the use can be enhanced, as the consumers will come back as satisfied customers (Vilkina, M. V et al.,2020). The study's main aim is to identify the impact of augmented technology on visual and auditory senses in sustainable consumption by online shoppers. The various types of techniques used in attracting consumers using visual and auditory products for online shoppers in choosing the best products, according to the choices and varieties of products. The Visual and auditory sensory products or promotional activities adopted by the company are sustainable for the customers in the online shopping mode. The study focuses on the sustainable consumption factors affecting online shoppers, with the influence of augmented technology on visual and auditory sensory factors. The consumer's attitude towards online products using augmented technology. Customers' purchase intentions are based on visual and auditory sensory factors. Identify the customer's knowledge about the product purchase through these sensory factors and technology.The study's background is presented in the first section. The review of the literature is the main topic of the second segment. The outcomes of the study are presented in the fourth section, while the research techniques are described in the third. This study concludes with a discussion of its shortcomings and areas for future investigation.

2. REVIEW OF LITERATURE

A methodical literature review approach was used in the study (Mohamed Shaffril, H. A et al., 2021). Paul et al. (2021) examined independent research as well as background studies on the application of augmented reality technology to online product promotion. 44 studies were located and chosen for the review based on the requirement that only English studies published in the last five years were included. Following the acquisition of the full text of each study work, 33 pieces of literature were chosen for a thorough assessment of their quality. Due to iterative procedures and quality issues, four studies were not included in the analysis. The current study is predicated on a comprehensive analysis of 29 scholarly publications that are pertinent to the topic. Each study's quality was evaluated by closely examining the publications, which were taken from reputed journals. Databases from Elsevier, Springer Nature, Emerald Group Publishing, Taylor & Francis, Routledge, and CRC Press were among the sources. Furthermore, additional publications were sourced from reputable academic databases like Guildford Press, Wiley, Academia, and JSTOR.

2.1 Literature Analysis

The next generation of virtual technology will transform online media consumption. Consumers may have a more immersive, multi-sensory experience using these technologies, as opposed to the more conventional, single-sensory internet [Gabajová, G et al., 2021]. Since the human senses are so integral to the consumption decision-making process, they argue that virtual technologies have a greater chance of influencing consumers' choices than the present digital world (Wang, Y. et all., 2022). Therefore, it is possible to use virtual technology to promote sustainable purchasing habits among customers. The field of technology-assisted sensory marketing describes the emotional and cognitive components of virtual reality and proposes applications of VR technology to encourage eco-friendly product purchasing. In addition to revolutionising several aspects of human existence, virtual technologies hold immense promise for a more sustainable future and the fight against climate change (Laukkanen, T et al., 2022). Sustainability in the environment has recently emerged as a global priority, with prominent groups and governments making concerted efforts to curb pollution and other environmental hazards. Because of this, companies are putting more effort into sustainability and pro-environment programs in an effort to get people to buy their green products instead of their old ones (Hwang et al., 2020). In order to take into consideration a green trust, environmental worries, and an inherent religious tendency, this study adjusts intended behaviour. Examining the moderating effect of intrinsic religious orientation on customers' attitudes towards green commodities, this study aims to assess the theory of planned behaviour and its enlarged version in order to predict the eco-conscious behaviour

of Pakistani consumers. Based on the SEM results, every path in the model is significant except for the one that goes from having an attitude towards green things to engaging in eco-conscious behaviour (Kim, J et al., 2009). A person's level of intrinsic religiosity does not moderate their trust in and attitude toward environmentally friendly items, according to the results (Liu, S et al., 2021). Online shopping has always had its challenges, one of which is the physical distance between customers and items, which can lead to customer scepticism (Rosenberg, L. B, 2022). A growing number of online retailers are showcasing their products via augmented reality. However, there is also considerable pessimism regarding the impact of augmented reality elements on consumer goods. This study explores how consumer sentiment is affected by augmented reality elements and how they reduce product uncertainty. (Thesen, T et al., 2004). The results show that AR can reduce fit uncertainty and product quality concerns while increasing mental images, a sense of presence, and perceived informativeness. When it comes to the link between augmented reality features and product uncertainty reduction, a few factors moderate it. These include product involvement, the demand for a rich sensory experience, and self-brand connection. (Thesen, T et al., 2004)

According to Zhang, T et al. (2004), Customers are increasingly opting to purchase long-lasting items online, thanks to the surge in e-commerce. To convey product information effectively, many presentation styles have been developed, including enlarged images, 360-degree rotating views, and three-dimensional views. Digital product presentations that use exploding views are the focus of this research (Cheng, P et al., 2023). A product's technical parts, their placement, and the assembly process may all be seen in an exploded view. Seeing the inner workings of a product might help buyers better understand its purpose and attributes, but it could also be overwhelming (Jawarneh, M et al., 2023). This study aims to shed light on the effects of exploded perspective on consumer processing by investigating how product function description influences consumers' knowledge, attitude, and buying intention (JO, J 2021).

A growing number of online stores are turning to VR and AR to help customers overcome the mental and physical barriers that come with trying to evaluate products in a virtual setting[Lazaris, C et al.,2022]. On top of that, the technology is easily accessible through cellphones. The authors conducted three tests to explore the reactions of hedonic and utilitarian product consumers to augmented reality/virtual reality and mobile app interfaces (Mbatha, V. D et al., 2023). According to the results, augmented reality (AR) is easier to use than applications, and consumers find it more responsive when buying hedonistic items rather than practical ones (Suh, K. S et al.,2005). Customers using touch interfaces are more likely to have a good time shopping and be more inclined to make recommendations than those using augmented reality. In contrast, an augmented reality (AR) multisensory environment enhances a hedonic product's user experience (Mishra, A. et al., 2021)

2.2 Research Gap

There are very few studies in the Indian context that measure the impact of AR technologies in achieving audiovisual sensory experiences, which leads to sustainable consumption among online shoppers (Sun, C et al 2022) (Zha, D et al.). More research is required to comprehend how AR technologies will affect the Indian consumers. In addition, it will be vital to study the long-term implications of AR on sustainability to ascertain its impacts on the environment and society as a whole. In the process of conducting more such studies, marketers and researchers will be able to access beneficial information about how AR technologies can be employed for sustainability in the online shopping experience.

2.3 Objectives of the Study

1. To examine consumer buying behaviour influenced by visual and auditory sensory technologies
2. To evaluate the impact of augmented reality technology on the sustainable consumption of products in online shopping platforms.

3. RESEARCH METHODOLOGY

Type of research - The study is based on exploratory research of consumer behaviour in purchasing products online using augmented technology in India through visual and auditory sensory technology, and their sustainable consumption using online shopping platforms.

Data collection sources and tools - The data is collected from primary sources, including online shoppers who are educational professionals, researchers, parents, and students. A structured questionnaire was designed with closed-ended questions and a Likert scale. Secondary data was gathered from open-access journals, publications, and shopping platform websites. All of the research instrument's constructs had reliability values between 0.9 and 0.95, which indicates excellent dependability. Because every dimension was confirmed and every construct satisfied validity requirements, the questionnaire was deemed both valid and reliable for the current model. The master validity tool created by Gaskins was used to further verify reliability and validity.

Duration of study - The present study employs a cross-sectional research design. Data were collected by the researcher through a survey conducted over four months.

Sample design - Cochran's formula was used to calculate the study sample size of 175 Indian respondents in order to attain a 7.5% margin of error at a 95% confidence level. Convenience sampling, a non-probability sampling technique, was used. The ease of access to a sizable pool of potential Indian online buyers served as justification for this strategy. Several demographic characteristics, such as age, gender, occupation, income level, and geography, were taken into account while choosing the sample.

Statistical tools of Analysis - The research used the software for data analysis (SPSS Version 22 and AMOS Version 22). These tools allowed for efficient study of the data collected and evaluation of relationships between variables. Utilising these software programs, the researchers employed statistical methods like factor analysis and structural equation modelling to gain more knowledge concerning the variables that affect the results of the study.

Scope of the study - The study mainly focuses on identifying the effectiveness of sustainable consumption of products through online shopping platforms using augmented reality with auditory and visual technology. The factors influencing the purchase of products are the various technological options available for consumers in purchasing products using augmented reality. The study helps in understanding consumer buying behaviour with visual and auditory sensory technology, the trends followed for sustainable consumption, and the buying attitude of consumers in purchasing the products. The research emphasises the buying trends of consumers for various products like cosmetics, clothing, and accessories, the income level, occupation, and other factors like visual and auditory technology impacting the purchase decision of consumers and their sustainable consumption of such products. The factors affecting the purchase decision for different products with sensory technology are also identified through secondary sources. The study helps identify the impact of sustainable consumption of products through augmented technology on the products purchased through online shopping platforms.

4. RESULTS AND DISCUSSION

4.1 Demographic profile of the respondents

The survey was collected from the Indian market and across the various cities in India, such as Karnataka, Tamil Nadu, Kerala, and North India. 48.7% are female respondents, and 51.3% are male respondents out of 80 respondents. The occupations of the respondents are business, self-employed, salaried, students, and unemployed youths; the majority of the online shoppers are the youths, the students and the salaried employees of various organisations; both constitute 84.6% of the respondents. Business people are very few and constitute 7.7% of the respondents, self-employed respondents are 5.1%, and unemployed youths constitute 2.6%. The annual income of the respondents lies between the slab of Rs. 250000 to 400000; the majority of the respondents are earning their annual income in the above slab, which constitutes 92.3%

of the responses, 2.6% constitutes the income between Rs. 50000- 250000, 5.1% constitutes between Rs. 400000 to 600000.

The current generation of youths and elders is adopting technology and using artificial intelligence, IoT, etc. Likewise, the study has identified that 84.6% of the respondents are shopping online with various platforms to purchase products using technology and the internet, and 15.4% of the respondents go to retail stores to shop for shopping the products as per their choice and trend.

4.2 Online shopping-related information

"The process of purchasing products online offers greater flexibility and convenience." The data reveal that 2.6% of the participants expressed strong agreement with the statement. Additionally, 59% of the respondents agreed that online shopping offers greater flexibility and convenience in comparison to retail shopping. Conversely, 2.6% disagreed with this statement, while 35.9% maintained a neutral stance regarding the extent to which online shopping is flexible and convenient for product shopping.

4.3 Augmented reality-related information

Augmented technology is an interactive environment where digital visual elements, sound and other stimuli and sensory works and customers are more aware of the products and specifications through the sensory stimuli and responses. 7.7% of the respondents strongly agreed that augmented technology had helped the respondents in better shopping experiences, 56.4% of respondents agreed with the statement, and 33.3% had a neutral perception of the statement, as augmented reality might be helpful or may not help provide better experiences to online shoppers. 2.6% strongly disagreed with the statement.

 The customers' experience while shopping on online platforms using augmented reality and visual and sensory stimuli technology has received a positive rating. 5.1% of the respondents rated it as 5, 61.5% rated it as 4, and 30.8% rated it as 3.2.6% of participants have assigned a rating of 2.A portion of the client base comprises individuals who frequently engage with online shopping platforms to purchase a diverse range of items. Specifically, 38.5% of the respondents have acknowledged their status as regular online shoppers, specifically in relation to their use of augmented technology for purchasing products. 33.3% of the participants indicated that they do not often engage in online shopping and do not purchase any items. Additionally, 28.2% of the participants expressed a neutral stance, stating that they are not frequent consumers but occasionally make online purchases using augmented reality.

A total of 35.9% of the participants acknowledged that their purchasing decisions on online platforms utilising augmented technologies are impacted by the opinions of their friends, family, and relatives. A total of 38.5% of the participants expressed their disagreement with the statement, while 25.6% maintained a neutral stance. This inclination can be attributed to the potential effect of others on their beliefs, as well as the possibility of being unaffected by such opinions.

2.6% of participants said they strongly agreed with the statement. - "The visual representations of the products showcased on the e-commerce platforms are identical to the products that are delivered to the customers," while 25.6% of the participants agreed with the statement. Additionally, 53.8% of the participants had a neutral opinion towards the statement. Furthermore, 10.3% of the participants disagreed with the statement, and 7.7% strongly disagreed with it. It has been discovered that using augmented reality in conjunction with visual sensory cues positively affects consumers' purchasing decisions once they are shown visual representations of the products.

 Customers' decisions to buy are greatly influenced by the visual representations offered on websites or online buying platforms. 10.3% of the participants express a strong agreement with the statement, 48.7% express agreement, 33.3% neither agree nor disagree, 5.1% disagree, and 2.6% strongly disagree. Typically, buyers assess the specifications and appearance of things by examining visual representations of the object in augmented reality and visual stimuli. This is due to the heightened visual appeal of appealing products showcased on online purchasing platforms. The utilisation of technology in response to visual cues has been found to have a favourable impact on customers' purchasing behaviour.Augmented reality has a positive influence on consumers' visual sensory experiences, leading to increased sustainability in regular online product purchases. Consumers prefer online consumption and regularly purchase products due to the impact of augmented technology and visually appealing product images. Sustainable online purchasing by consumers refers to the consistent acquisition of products through online platforms at regular intervals. Research indicates that 38.5% of respondents agree that they are regular customers who buy products online using augmented technology with visual sensory stimuli. Additionally, 7.7% strongly agree that they are regular online purchasers. On the other hand, 53.8% of consumers remain neutral, as they may use augmented technology with visual sensory stimuli whenever necessary for their purchases.

79.5% of the participants only buy things as needed, whereas 5.1% make weekly purchases, 10.3% make biweekly purchases, and 5.1% make monthly purchases on online shopping platforms that utilise augmented reality technology with visual technology.

Online shopping websites and platforms use aural sensory technology, allowing consumers to engage with the auditory aspects of the things they want to purchase. This enables them to make more informed judgments when selecting the most suitable products from a range of possibilities. The favourable rating pertains to the use of aural sensory technologies in influencing the purchasing choice of products on online platforms. 7.7% of the participants provided a rating of five for the auditory sensory technology, while 61.5% assigned a value of 4. Additionally, 25.6% of the respondents ranked the auditory sensory technology experience as 3, while 5.1% rated it as 2.

The influence of sound effects and animations on consumer purchasing decisions in online platforms was found to be significant. Among the respondents, 2.6% strongly agreed, 38.5% agreed, 53.8% had a neutral opinion, and 2.6% disagreed with the statement.

Online shopping systems that utilise augmented reality technology enable customers to engage with the company offering the items they are purchasing. This connection facilitates a deeper comprehension of the products and allows customers to acknowledge the intricate aspects of the products, accompanied by appropriate replies from the firm. Among the participants, 5.1% expressed a strong agreement regarding their consistent engagement with the product company via online shopping platforms. Additionally, 48.7% of the respondents agreed with this statement, while 43.6% held a neutral perception. Conversely, 2.6% of the participants disagreed with the notion that augmented reality does not facilitate customer interaction with the product company on online shopping platforms.

4.4 Testing of Hypothesis

H1 – There is an impact of demographics on the perception of AR technologies by online shoppers

Table 1 – ANOVA and Independent t-test results – for the impact of demographics on perception of AR technologies by online shoppers

Demographic Variables	ANOVA- F Statistics				Independent t-test
	Age	Qualification	Marital Status	Monthly Income	Gender
The Visual images of products on the online shopping websites influence me in my purchase decision	4.922*	1.835	0.151	3.034	4.547
The sound effects and animations influence the purchase of the product or service.	9.827*	1.217	0.276	2.413	4.029

The AR Technology items are significant on a statistical level for at least one of the Age groups at p-value =.000. The Scheffe post hoc results highlight that the influence of AR technologies on online shoppers' purchase decision is least for those above 45 years of age. For all consumers of this age group, it is possible that the feasibility of the technology is still an issue. The interpretation can be made that older online consumers are not interested or comfortable using AR technologies. The younger consumers view the integration of AR as innovative and are willing to experiment; they believe that its use can add value to the purchasing process. When consumers' age, preferences and tech-savvy trends also age, they should be considered in AR incorporation in online shopping. However, on the other hand, qualification, gender, marital status and monthly income are insignificant. The study finds that age significantly differentiates in how consumers perceive and apply AR Technologies in their shopping. Younger shoppers are more likely to view AR usage as beneficial for their purchase decision-making because of their general acceptance of new technology trends. Whereas older consumers need more support and guidance to become familiar with and comfortable with using AR. Retailers need to input these parameters to design and facilitate AR technology usage in their online platforms to support a diverse range of customers, depending on their comfort with the tech.

H1 – There is an impact of demographics on the perception of AR technologies by online shoppers, which is accepted

H2- There is a significant impact of AR technologies on the sustainable consumption behaviour of online shoppers

Model fit - 2.982 is the chi-square divided by degrees of freedom ($\chi2/df$), falling inside the permissible range of 3. The observed goodness-of-fit value (0.916) outperforms the proposed attributes. According to the boundary estimation, the RMR value is 0.089. In the area, the model in question is well-known, and its fit metrics make sense.
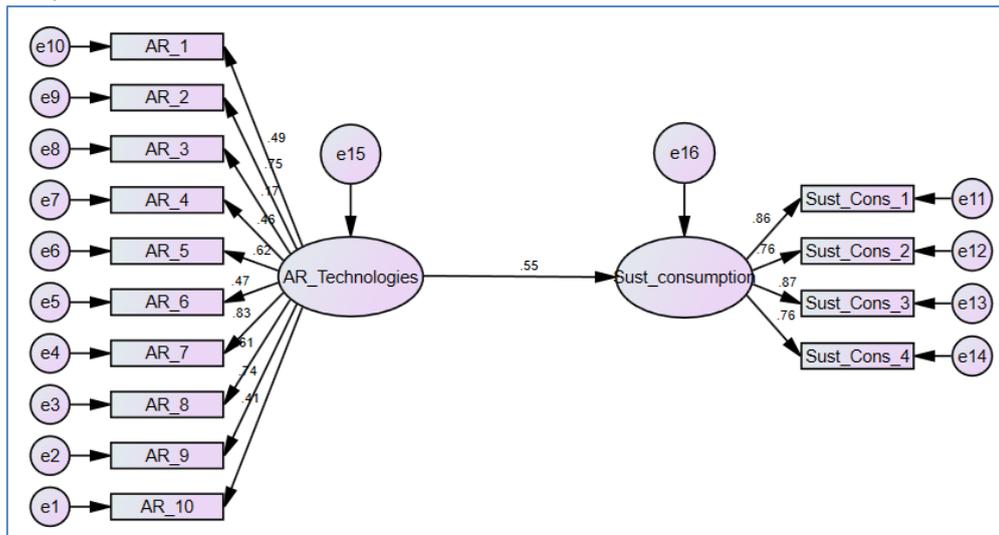

Figure 1- Structural equation model for the impact of AR technologies on sustainable consumption

As seen in Figure 1, Online customers' sustainable consumption behaviour will improve by 55% for every unit increase in mean augmented reality scores. This association is statistically significant at 0.000 (B=0.675, b=0.551, p<=0.05). Augmented reality technologies applied in marketing differ and develop further. Starting from simple AR apps that enable the customers to virtually try the products they like and reaching more complex AR items that make the brand experience more interactive and immersive, the applications seem to be unlimited. Marketers can find innovative solutions to use AR in ways that have never been applied before. Given that augmented reality is becoming more popular, in the future, it will likely be more actively used in marketing due to more innovative decisions. For example, augmented reality cases include AR-powered product packaging that comes to life when one scans the smartphone, trying on clothing and accessories virtually, and interacting with AR images to get more familiar with the brands. AR cases are likely to be more common in marketing due to the need to get the audience's attention and provide an experience. Since the technologies continue to develop, the potential for marketing-related applications in AR develops as well.

H2- There is a significant impact of AR technologies on the sustainable consumption behaviour of online shoppers, which is accepted

This result implies that leveraging Augmented Reality technology in shopping platforms could make a substantial contribution to efforts that encourage sustainable consumption patterns. Since AR technology allows for a more engaging and interactive shopping experience, consumers might prefer putting their emphasis on selecting environmentally friendly products (Chylinski, M et al., 2020). This reaffirms that technology has the potential to promote positive behaviour and align with the sustainability goals of the clothing industry (Jawarneh, M et al., 2023). Furthermore, AR can assist consumers in making better-informed decisions on the implications of the planned purchase. For instance, AR overlays product origin, materials used, manufacturing process, and carbon emission information, which helps shoppers make an educated, ethical choice (Rosenberg, L. B. 2022). This way, shoppers become more informed and, hence, able to demand products from manufacturers and retailers based on information on the environmental aspect. Generally, the integration of AR technology can indeed change the conventional shopping models and promote a circular economy (Thesen, T et al., 2004)

CONCLUSION

Augmented reality (AR) can revolutionise how we perceive and interact with online shopping platforms, promoting sustainable consumption of products. By integrating visual and auditory sensory stimuli into AR experiences, online shoppers can make more informed and conscious purchasing decisions, reducing waste, improving resource management, and creating a more sustainable consumer culture. AR technology allows users to virtually visualise products in their real-world environment, giving them a realistic sense of size, scale, and appearance. Additionally, by simulating the appearance and properties of sustainable materials, AR can raise awareness and promote eco-friendly alternatives. Furthermore, integrating auditory sensory stimuli in AR experiences can enhance shopping. Shoppers can access additional product information, such as sustainability certifications, ethical sourcing, and manufacturing practices, through interactive audio guides or voice assistants. Audio cues can also provide real-time feedback on the environmental impact of a product, such as its carbon footprint or energy efficiency, enabling users to make environmentally conscious choices. Augmented reality can produce a more engaging and educational online shopping experience that promotes sustainable consumption by fusing visual and aural sensory inputs. Customers can see and hear pertinent product information, which promotes a better comprehension of their environmental impact. Customers may support sustainable firms and raise demand for eco-friendly products by aligning their principles with their shopping habits, thanks to this greater transparency. Online shopping systems have the ability to encourage sustainable product consumption through the integration of visual and audio sensory

stimulation using augmented reality. AR helps customers to make thoughtful decisions, cuts waste, and boosts demand for sustainable goods by offering a more engaging and educational purchasing experience. The study has finally identified the positive impact of augmented reality with visual and auditory sensory stimuli and the sustainable buying behaviour of consumers in online shopping platforms. The purchase decision of the consumers, the influential factors in buying behaviour, and the sensory technology, like visual and auditory stimuli, help in the consumers' decision-making process. In conclusion, while augmented reality with visual and auditory sensory stimuli has the potential to enhance sustainable consumption through online shopping platforms, there are several limitations to consider. Technical constraints, cost, accessibility, user experience, data privacy and security, environmental impact, and limited sensory experiences are factors that need to be addressed to maximise the benefits of AR for promoting sustainable consumption. Furthermore, research can be done on other sensory stimuli like touch, taste and odour with virtual and augmented technology and their impact on the consumers' purchase decisions. The latest technology is used to attract consumers in virtual and augmented reality.

References

1. Cheng, P., & Zhang, C. (2023). Show me insides: Investigating the influences of product exploded view on consumers' mental imagery, comprehension, attitude, and purchase intention. *Journal of Retailing and Consumer Services*, p. *70*, 103168.

2. Chylinski, M., Heller, J., Hilken, T., Keeling, D. I., Mahr, D., & de Ruyter, K. (2020). Augmented reality marketing: A technology-enabled approach to situated customer experience. *Australasian Marketing Journal*, *28*(4), 374-384.

3. Dargan, S., Bansal, S., Kumar, M., Mittal, A., & Kumar, K. (2023). Augmented Reality: A Comprehensive Review: S. Dargan et al. *Archives of Computational Methods in Engineering*, *30*(2), 1057-1080.

4. Du, Z., Liu, J., & Wang, T. (2022). Augmented reality marketing: A systematic literature review and an agenda for future inquiry. *Frontiers in psychology*, *13*, 925963.

5. Furht, B. (Ed.). (2011). *Handbook of augmented reality*. Springer Science & Business Media. https://share.google/uAk88ohoNPZq2smCn

6. Gabajová, G., Krajčovič, M., Furmannová, B., Matys, M., Biňasová, V., & Stárek, M. (2021). Augmented reality is a powerful marketing tool. *Proceedings of CBU in Economics and Business*, *2*, 41-47.

7. Hwang, A. H. C., Oh, J., & Scheinbaum, A. C. (2020). Interactive music for multisensory e-commerce: The moderating role of online consumer involvement in experiential value, cognitive value, and purchase intention. Psychology and Marketing, 37(8), 1031–1056. https://doi.org/10.1002/mar.21338

8. Jawarneh, M., Alshar'e, M., Dewi, D. A., Al Nasar, M., Almajed, R., & Ibrahim, A. (2023). The impact of virtual reality technology on Jordan's learning environment and medical informatics among physicians. *International Journal of Computer Games Technology*, *2023*.

9. JO, J. (2021). *A Study on the Effect of Marketing Using Virtual Mirror Technology on Customer Satisfaction* (Doctoral dissertation, KDI School).

10. Kim, J., & Forsythe, S. (2009). Adoption of sensory-enabling technology for online apparel shopping. European Journal of Marketing, 43(9), 1101–1120. https://doi.org/10.1108/03090560910976384

11. Kumar, H., Gupta, P., & Chauhan, S. (2023). Meta-analysis of augmented reality marketing. *Marketing Intelligence & Planning*, *41*(1), 110-123.

12. Laukkanen, T., Xi, N., Hallikainen, H., Ruusunen, N., & Hamari, J. (2022). Virtual technologies supporting sustainable consumption: From a single-sensory stimulus to a multisensory experience. *International Journal of Information Management*, *63*, 102455.

13. Lazaris, C., Vrechopoulos, A., Sarantopoulos, P., & Doukidis, G. (2022). Additive omnichannel atmospheric cues: The mediating effects of cognitive and affective responses on purchase intention. *Journal of Retailing and Consumer Services*, p. *64*, 102731.

14. Liu, S. F., Lee, H. C., & Lien, N. H. (2021). Do fast fashion consumers prefer foreign brands? The moderating roles of sensory perception and consumer personality on purchase intentions. Asia Pacific Management Review, 26(2), 103–111. https://doi.org/10.1016/j.apmrv.2020.09.001

15. Mbatha, V. D., Koopman, A., & Chuchu, T. (2023). Examining the Impact of Sensory Marketing on Young Consumers: A McDonald's Case Study. International Review of Management and Marketing, 13(3), 16–24. https://doi.org/10.32479/irmm.14320

16. Mishra, A., Shukla, A., Rana, N. P., & Dwivedi, Y. K. (2021). From "touch" to a "multisensory" experience: The impact of technology interface and product type on consumer responses. Psychology and Marketing, 38(3), 385–396. https://doi.org/10.1002/mar.21436

17. Mohamed Shaffril, H. A., Samsuddin, S. F., & Abu Samah, A. (2021). The ABC of systematic literature review: the basic methodological guidance for beginners. *Quality & Quantity*, *55*, 1319-1346.

18. Paul, J., Lim, W. M., O'Cass, A., Hao, A. W., & Bresciani, S. (2021). Scientific procedures and rationales for systematic literature reviews (SPAR-4-SLR). *International Journal of Consumer Studies*, *45*(4), O1-O16.

19. Rauschnabel, P. A., Babin, B. J., Tom Dieck, M. C., Krey, N., & Jung, T. (2022). What is augmented reality marketing? Its definition, complexity, and future. *Journal of Business Research*, *142*, 1140-1150.

20. Rosenberg, L. B. (2022). Augmented reality: reflections at thirty years. In *Proceedings of the Future Technologies Conference (FTC) 2021, Volume 1* (pp. 1-11). Springer International Publishing.

21. Suh, K. S., & Lee, Y. E. (2005). The effects of virtual reality on consumer learning: An empirical investigation. *Mis Quarterly*, 673-697.

22. Sun, C., Fang, Y., Kong, M., Chen, X., & Liu, Y. (2022). Influence of augmented reality product display on consumers' product attitudes: A product uncertainty reduction perspective. *Journal of Retailing and Consumer Services*, *64*, 102828.

23. Thesen, T., Vibell, J. F., Calvert, G. A., & Sterbauer, R. A. (2004). Neuroimaging of multisensory processing in vision, audition, touch, and olfaction. Cognitive Processing, 5(2), 84–93. https://doi.org/10.1007/s10339-004-0012-4

24. Vilkina, M. V., & Klimovets, O. V. (2020). Augmented reality as marketing strategy in the global competition. In *The 21st Century from the Positions of Modern Science: Intellectual, Digital and Innovative Aspects* (pp. 54-60). Springer International Publishing.

25. Wang, Y., Ko, E., & Wang, H. (2022). Augmented reality (AR) app use in the beauty product industry and consumer purchase intention. *Asia Pacific Journal of Marketing and Logistics*, *34*(1), 110-131.

26. Wedel, M., Bigné, E., & Zhang, J. (2020). Virtual and augmented reality: Advancing research in consumer marketing. *International Journal of Research in Marketing*, *37*(3), 443-465.

27. Xu, X. Y., Jia, Q. D., & Tayyab, S. M. U. (2024). Exploring the stimulating role of augmented reality features in E-commerce: A three-staged hybrid approach. *Journal of Retailing and Consumer Services*, *77*, 103682.

28. Zha, D., Melewar, T. C., Foroudi, P., & Jin, Z. (2020). An Assessment of Brand Experience Knowledge Literature: Using Bibliometric Data to Identify Future Research Direction. International Journal of Management Reviews, 22(3), 287–317. https://doi.org/10.1111/ijmr.1222

29. Zhang, T., Wang, W. Y. C., Cao, L., & Wang, Y. (2019). The role of virtual try-on technology in online purchase decisions from the consumer's perspective. *Internet Research*, *29*(3), 529–551