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EXPLORING THE IMPACT OF AUGMENTED REALITY MARKETING ON CUSTOMER UNDERSTANDING OF SUSTAINABLE PRACTICES

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Abstract

Over the past few years, the growing awareness of climate change and environmental degradation has heightened the need for sustainable consumption. This has prompted companies to embrace sustainability-oriented marketing strategies. Nevertheless, conventional media tends to fail in effectively communicating complex environmental ideas to consumers. This research investigates the potential of Augmented Reality (AR)-based marketing strategies in promoting customer comprehension of sustainable practices. AR, an interactive technology that superimposes digital information onto the physical world, provides a new and engaging means of delivering green messages. Using a quantitative research design, a sample of 400 respondents across various age groups and industry sectors—such as consumer goods, retail, and sustainability—was surveyed to measure the effect of AR-based campaigns. Regression analysis indicated that AR marketing had a statistically significant positive relationship with consumer knowledge of sustainability, with AR accounting for 45.2% of the variance in customer understanding of sustainable practices ($R^2 = 0.452$, $p < 0.001$). From the findings, it is clear that AR marketing not only increases awareness but can also be used to change behaviour towards eco-friendly decisions. This research makes a valuable contribution to the literature on green marketing and digital innovation by highlighting the efficiency of AR as a strategic communication medium. It also presents practical implications for marketers seeking to tie their campaigns into sustainability agendas while using emerging technologies.

Keywords: Augmented Reality (AR); Sustainable Practices; Consumer Awareness; Green Marketing; Digital Innovation; Immersive Technology; Marketing Strategies; Environmental Consciousness; Sustainability Communication; Consumer Behaviour.

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1. Introduction

Growing worries about global warming and environmental deterioration have pushed sustainability to the forefront of business and consumer priorities in recent years. The desire for sustainable and environmentally friendly options has been pushed by consumers who are increasingly conscious of the impact their product and service choices have on the environment. Businesses have started to show their environmental beliefs and engage with customers on a deeper level by integrating sustainability into their marketing strategies. Traditional advertising methods often fall short in making an impact or conveying complex environmental concepts due to the abundance of sustainability-related messages. Here we see the introduction of cutting-edge innovation, such as AR. By bridging the gap between consumers and sustainability messaging, augmented reality offers a novel and interesting way to interact with information, something that conventional media cannot do (Bulearca & Tamarjan, 2010).

The term "augmented reality" refers to a layering technology that enhances the user's perception of the real environment by superimposing digital information on top of it. One of the greatest ways to get the word out about sustainability is through an immersive experience that allows for more conversational and interesting dialogue. By letting people experience the results of their purchases, learning about the lifespan of eco-friendly items, and interacting with digital representations of sustainable activities, AR may bring environmental facts to life. Especially in the realm of sustainable product and practice marketing, augmented reality's ability to provide such engaging, real-time experiences has made it a highly sought-after marketing tool. The three main ways in which AR could influence consumer behavior are by capturing users' attention, fostering an experiential understanding of sustainability, and offering engaging, interactive experiences that prompt users to reflect on their purchasing choices. (Hartwig, 2024).

The main aim of this research is to investigate how augmented reality-based marketing strategies can improve customers' awareness of sustainable practices. Although past research has investigated the performance of AR in different marketing environments, less research has specifically targeted its potential to promote sustainability. This paper seeks to contribute to the field by exploring the ways in which AR can effectively convey sustainability messages and how it affects consumer knowledge and awareness. Particularly, the study aims to investigate the degree to which AR promotional strategies enhance customers' awareness of sustainable practices and if

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they promote more environmentally friendly behaviours. By concentrating on the crossroads of AR technology and green marketing, the research will offer useful insights into how companies can capitalize on these technologies to accelerate more attention toward sustainability and environmental consciousness among consumers (Javeed et al., 2024).

As companies increasingly embrace digital technologies in their marketing, it is important to evaluate the efficacy of these innovations, especially their ability to influence consumer behaviour positively and sustainably. This study is particularly important in the case of industries like retail, consumer goods, and sustainability industries, where marketing efforts can directly affect consumer choice and attitudes towards sustainability. Through examining the function of AR in driving the knowledge of sustainable practices, this research seeks to add to the overall research body on the use of digital technology to foster sustainability. Lastly, the results will provide actionable insights for companies interested in leveraging AR to connect with customers, create awareness of sustainability, and encourage more sustainable consumer behaviour (Qadri et al., 2023).

Objective of Study: To analyze the impact of augmented reality-enabled marketing strategies on enhancing customer understanding of sustainable practices.

2. Review of Literature

Within the framework of fashion item purchases in developing nations, Kazmi et al. (2021) examined the effects of AR experiences on customer behavior, purchasing intentions, and enjoyment. Theoretically, this study has a lot of weight for researchers in the future who might try to apply the final model to the fashion industry in both developed and developing countries. With an eye toward analyzing the potential and limitations of augmented reality in sustainable business, this chapter of Caboni & Bruni (2022) sets out to do just that. The first part of this research looks at how AR could help with sustainable retailing by comparing what is already known about AR's function in retail with the 3Ps (Planet, People, and Profit) concept of corporate sustainability.

Using analytic-descriptive approaches and data obtained from a snowball sample of 812 online shoppers, Hilal & Saud's 2023 study aimed to examine the impact of AR on Saudi consumers' shopping behavior. The results show that augmented reality has a big effect on people's choice to buy and suggest that it may be used in advertising.

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From the perspectives of students, teachers, and experts from various fields, Negi's comprehensive research from 2024 examines how virtual reality and augmented reality affect sustainable education. Thirty people are chosen to evaluate the revolutionary possibilities of augmented and virtual reality in environmental education. By fusing theory and practice, these tools make immersive learning possible, according to the research.

The study by Alghizzawi et al., 2025 delves at the various ways AR can influence customer behavior in different sectors. In the medical field, augmented reality improves surgical accuracy and medical education, while in the retail sector, it allows for interactive shopping and virtual try-ons. AR is still a work in progress, but it has the potential to overcome obstacles like privacy worries and technological limitations to find new uses that will revolutionize the way customers engage with brands.

Hypothesis of Study

H_0: Augmented reality-enabled marketing strategies have no significant impact on customers' understanding of sustainable practices.

H_1: Augmented reality-enabled marketing strategies have a significant impact on customers' understanding of sustainable practices.

3. Methodology

This research used a quantitative study design to examine the influence of AR marketing on customer comprehension of environmentally friendly practices. The population of interest was those who have been exposed to AR-based green marketing campaigns. In consideration of diversity and maximization of inclusion, participants were selected from diverse demographic backgrounds as well as different professional landscapes, with customers in the consumer goods, retail, and sustainability sectors as primary targets.

A sample size of 400 participants was used to provide room for robust statistical analysis and to facilitate the generalizability of the results. Simple random sampling was utilized to pick participants from the population, with each participant having an equal chance of being selected. This method avoided sampling bias and aided in the preservation of the sample's representativeness.

Data collection was carried out using an online survey instrument, which made it easier to reach a larger population and make the process of collecting responses simpler. The survey contained

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formal questions that were used to gauge participants' exposure to AR-based marketing and knowledge about sustainable practices.

To examine the data, regression analysis was employed as the main statistical method. The method was able to assess the correlation between AR-marketing strategy and customer awareness of sustainability. The findings showed the efficiency of AR in increasing awareness and encouraging sustainable consumerism.

4. Results

A. Demographic Profile of Respondents

Table 1: Demographic Profile of Respondents

Variable	Sub-Construct	Frequency
Gender	Male	188
	Female	208
	Non-binary / Prefer not to say	4
Age Group	18–25 years	112
	26–35 years	136
	36–45 years	88
	46 years and above	64
Industry Exposure	Consumer Goods	160
	Retail	128
	Sustainability / Environmental	112

B. Regression Analysis

Table 2: Model Summary

Model	R	R^2	Adjusted R^2	Standard Error
1	0.672	0.452	0.448	0.621

Table 3: ANOVA

Model	Sum of Squares	df	Mean Square	F	Sig. (p-value)
Regression	18.200	1	18.200	47.126	0.000
Residual	153.500	398	0.386		
Total	171.700	399			

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Table 4: Coefficients

Model	Unstandardized Coefficients (B)	Standardized Coefficients (Beta)	t	Sig. (p-value)
(Constant)	2.100			
AR Marketing	0.580	0.672	6.865	0.000

The findings of the current research establish a significant positive correlation between AR marketing and consumer knowledge of sustainable practices. The sample was demographically quite even in gender terms with a slight excess of female respondents and comprised a varied age range with the largest proportion in the 26–35 years' category. Exposure to industries was evenly spread between consumer goods, retail, and sustainability categories. The regression test revealed that AR marketing explained 45.2% of customer sustainability understanding variance (R^2 = 0.452). The model was statistically significant since F-value and the p-value stood at 47.126 and 0.000 respectively. The coefficients indicated that AR marketing had a significant, positive impact on customers' comprehension of sustainable practices, with a standardized Beta of 0.672, meaning that AR marketing efforts significantly improve consumer awareness of sustainability.

Table 5: Results of Hypothesis Testing

Objective	Hypothesis	Result
To analyze the impact of augmented reality-enabled marketing strategies on enhancing customer understanding of sustainable practices.	**H0:** "Augmented reality-enabled marketing strategies have no significant impact on customers' understanding of sustainable practices".	**Rejected**
	H1: "Augmented reality-enabled marketing strategies have a significant impact on customers' understanding of sustainable practices".	**Accepted**

5. Discussion

The results of this research show that the use of AR-based marketing practices has a strong positive effect on customer comprehension of sustainable practices. The regression analysis showed that

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45.2% of customer comprehension of sustainability can be explained by AR marketing, indicating the power of AR in delivering green messages. The significant results statistically (p-value = 0.000) and the high beta coefficient value (0.672) support the fact further that AR plays a significant part in shaping the perception of customers and raising awareness for sustainability. Demographically, the sample itself was mixed in terms of being quite evenly gender-balanced as well as with a mix of different age groups, especially the 26–35 years' bracket, which is generally more susceptible to new technology and sustainability projects. This demographic, and the inclusion from industries like consumer goods, retail, and sustainability, indicates that AR marketing is applicable across various sectors. The results of this study are congruent with other literature that implies immersive technologies like AR better engage consumers than non-immersive advertisement forms, such that sustainability-themed content is better remembered and has greater impact. This heightened activity can lead to consumers making more environmentally friendly choices, further emphasizing the ability of AR to not only inform but also inspire behavioural change. Retail and consumer goods companies should explore incorporating AR into their marketing mix to maximize their sustainability efforts and reach a wider, better-educated audience. More studies may explore the ways in which various types and formats of AR content influence consumer behaviour in the long term, giving richer insights into how AR marketing continues to shape lasting sustainable consumption habits.

6. Conclusion

This research affirmatively proved that AR-driven marketing activities have a great and positive effect on increasing consumers' knowledge about sustainable practices. By examining responses from a range of 400 participants from various sectors, the research identified that AR not only makes customers interact more effectively but also acts as an effective instrument for delivering elaborate sustainability messages. The regression analysis confirmed that there is a robust connection between AR marketing and consumer consciousness, and with a significant share of variance in understanding sustainability explained by integrating AR. The research emphasizes the ability of immersive technology to revolutionize green marketing strategies. In contrast to conventional advertising, AR allows for experiential, interactive learning, enabling consumers to imagine the environmental consequence of their actions. Such sensory involvement triggers stronger recall and more significant behavioural change towards sustainable consumption.

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The research has significant implications for companies, particularly those in consumer goods, retail, and sustainability industries. With consumers becoming increasingly environmentally conscious, AR presents an opportunity to narrow the knowledge gap and drive environmentally friendly consumption. Companies that intend to be industry leaders in sustainability must thus think about embracing AR as a vital part of their marketing strategies in order to create environmental awareness and behavioural change. Future studies can build on these results by examining long-term behavioural effects of AR-based sustainability campaigns, evaluating the efficacy of various AR content formats, or contrasting AR with other new technologies in environmental communication. In the end, this study contributes to the expanding literature in favour of strategic adoption of digital innovations such as AR for driving sustainable development goals.

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