

Augmented reality and consumer Perception A Comprehensive Study Based on Secondary Data Analysis

Ms. Nisha Singh

Research Scholar,

IILM University, Gurugram

DGM – Corporate Communication (TCIL)

nisha.singh.phd21@iilm.edu

Dr. Manisha Joshi

Associate Professor, School of Management

IILM University, Greater Noida

manisha.joshi@iilm.edu

ABSTRACT

In today's ever-evolving market landscape, businesses grapple with the challenge of capturing consumer attention amidst a myriad of marketing strategies. Augmented Reality (AR) emerges as a disruptive force, transforming conventional approaches and presenting innovative avenues for business-to-consumer (B2C) interaction. By allowing consumers to virtually engage with products in real-time, AR technology redefines the dynamics of product engagement and advertising, promising to reshape brand-consumer relationships.

This paper embarks on a comprehensive exploration of AR's pivotal role in shaping consumer perception, with a specific focus on non-physical product interactions. It investigates the impact of AR on customer brand engagement and purchase intent while also addressing concerns related to accessibility and affordability.

Drawing upon a systematic literature review spanning from 2010 to 2024, this study synthesizes insights from a multitude of sources to provide a nuanced understanding of AR implementation across various sectors. The articles reviewed are meticulously categorized based on independent variables, offering a holistic perspective on current practices and challenges. By shedding light on the landscape of AR adoption, this paper contributes to the advancement of augmented reality as a transformative force in both consumer perception and market dynamics.

Keywords: Augmented Reality, AR, Retailing, Technology, Consumer attitudes, TAM, attitude components, Digital Marketing, customer experience, customer value.

Introduction

In today's fiercely competitive business landscape, organizations are relentlessly seeking innovative strategies to bolster their market presence and promote their offerings. Traditional marketing approaches, once the stalwarts of product promotion, are gradually proving insufficient in meeting the dynamic demands of contemporary markets. The proliferation of internet users and the rising levels of literacy have catalyzed a seismic shift in consumer behavior, with an increasing preference for digital media over traditional avenues (Singh & Pandey, 2014). Consequently, traditional media channels have witnessed dwindling efficacy, leading to a decline in brand equity and purchase intent (Kenyon & Sen, 2012).

In response to the evolving consumer landscape, businesses are compelled to adopt digital advertising strategies that not only promote their offerings but also resonate with customers on a deeper level. Augmented Reality (AR) has emerged as a transformative force in the marketing domain, offering a dynamic platform for business-to-consumer (B2C) interaction. By overlaying virtual elements onto the physical environment, AR technology enables consumers to engage with products in real-time, heralding a paradigm shift in product engagement and advertising dynamics.

The proliferation of AR applications, particularly in retail settings, underscores its potential as an interactive marketing tool. With the advent of smart device applications, AR has become increasingly prevalent, offering consumers immersive experiences that transcend traditional marketing approaches (Javornik, 2016). The ability of AR to seamlessly integrate virtual features with the physical environment has opened new vistas for content delivery and consumer interaction, fundamentally altering consumer behaviors such as product searches and testing.

As the adoption of AR technology continues to soar, recent research highlights its transformative impact on consumer experiences and business outcomes. For example, a study by Zhang et al. (2023) emphasizes how AR-based advertising fosters emotional engagement, which directly influences brand recall and purchase decisions. Similarly, Kumar & Malik (2023) identify AR as a critical tool for enhancing experiential marketing, particularly in fashion and furniture retail. These findings are supported by the work of Chen et al. (2024), who argue that AR provides a competitive edge by personalizing customer experiences through real-time interaction and product customization.

The burgeoning market size of AR, exemplified by the projected growth to US\$ 14.07 billion in India by 2027 (Research & Markets), underscores its transformative potential in reshaping consumer experiences across diverse sectors. From retail to gaming, AR has permeated various industries, offering unparalleled opportunities for businesses to engage with consumers in innovative ways.

However, despite its immense potential, there remains a dearth of research examining the nuanced interplay between AR technology and consumer perceptions, particularly in retail settings. While retail giants like Sephora and IKEA have embraced AR to enhance customer experiences, empirical evidence regarding the effectiveness of AR in influencing consumer behavior remains scarce (Brynjolfsson et al., 2013; Archer, 2016). Recent studies by Lee & Park (2023) and Thompson et al. (2024) underscore the need for more empirical investigations into the psychological and behavioral dimensions of AR in retail, highlighting the gap in understanding AR's long-term impact on brand loyalty and consumer trust.

This research paper aims to bridge this gap by conducting a comprehensive exploration of the pivotal role of AR in shaping consumer perception. Drawing upon a systematic literature review spanning from 2010 to 2024, this study seeks to elucidate the underlying mechanisms through which AR influences consumer attitudes and behaviors. By synthesizing insights from diverse sources, this paper endeavors to contribute to a deeper understanding of AR's transformative potential in consumer perception and market dynamics.

Research Aim:

This research aims to conduct a comprehensive synthesis of existing literature on augmented reality (AR) and its impact on consumer perception and engagement across various contexts. By systematically reviewing and analyzing relevant studies, the paper seeks to identify the current trends, challenges, and opportunities in AR research as it pertains to consumer perception and engagement. Furthermore, the study aims to develop a conceptual framework that elucidates the multifaceted relationship between AR technology and consumer behavior, with a focus on understanding the mechanisms underlying consumer perception and engagement in AR-enhanced environments. Through secondary data analysis, this paper aims to contribute to a deeper understanding of how AR influences consumer perceptions, attitudes, and behaviors beyond specific industries, thereby informing future research agendas and practical applications of AR technology in diverse domains.

Research Focus and Objectives:

Augmented reality (AR) technology has emerged as a transformative tool with applications spanning various domains beyond retail, attracting substantial academic attention due to its potential to reshape consumer perceptions and engagement. Despite its inception dating back to the 1960s, the field of AR research has seen significant growth in recent years, with research efforts extending across diverse disciplines. However, the fragmented nature of existing literature on AR's impact on consumer perception and engagement necessitates a comprehensive synthesis to elucidate current trends, challenges, and opportunities in this burgeoning field.

This paper aims to address this gap by conducting a systematic review and synthesis of existing literature on AR and its influence on consumer perception and engagement across diverse contexts. The overarching objectives of this study are as follows:

1. **Critical Review of AR Literature:** This study seeks to undertake a comprehensive review of the AR literature across various domains, including retail, marketing, education, healthcare, and entertainment. By synthesizing insights from multidisciplinary perspectives, the paper aims to provide a comprehensive understanding of the current state of AR research and its implications for consumer perception and engagement.
2. **Evaluation of AR Research Trends and Gaps:** The paper endeavors to evaluate current AR research trends and identify gaps in the literature pertaining to consumer perception and engagement. By critically analyzing existing

studies, the study aims to highlight areas that require further investigation and elucidate key research gaps in understanding the mechanisms underlying consumer responses to AR technology.

3. **Development of a Conceptual Framework:** Building upon the synthesized insights, the study aims to develop a conceptual framework that delineates the key dimensions of AR's influence on consumer perception and engagement. Drawing upon multidisciplinary perspectives, the paper seeks to outline a theoretical framework that integrates insights from diverse domains and guides future research endeavors in this field.

Through these objectives, this study aims to make several contributions to the existing literature:

- **Comprehensive Synthesis of AR Research:** By reviewing literature across diverse domains, the paper aims to provide a comprehensive synthesis of current AR research trends and insights into its implications for consumer perception and engagement.
- **Identification of Research Gaps:** Through critical analysis, the study aims to identify gaps in current AR research, thereby highlighting areas for future investigation and scholarly inquiry.
- **Development of a Theoretical Framework:** The paper seeks to develop a theoretical framework that integrates insights from multidisciplinary perspectives, providing a roadmap for future research endeavors and guiding the development of innovative AR applications across various domains.

Research Methodology:

This research adopts a systematic literature review approach to investigate the impact of augmented reality (AR) on consumer perception and engagement across various contexts. The methodology encompasses the following key steps:

1. **Selection Criteria:** The systematic literature review covers the period from 1997 to 2024, with a primary focus on papers published from 2018 onwards to capture the latest trends in AR research. However, earlier works are included for historical comparisons. This approach ensures a comprehensive synthesis of relevant literature while emphasizing recent developments in AR research.
2. **Database Selection:** To mitigate database biases, a diverse range of academic databases is selected for literature retrieval. These include Google Scholar, Elsevier, Emerald, Springer, Scopus, and the Web of Science. Specifically, journals in the fields of marketing, retailing, consumer behavior, and technology are targeted, given the interdisciplinary nature of AR research.
3. **Search Strategy:** A predefined protocol outlines the search strategy, including search terms and filters to identify relevant literature. Key search terms such as "augmented reality," "AR," "retailing," "consumer behavior," and "customer experience" are employed, drawing upon established frameworks and previous studies in the field (Dacko, 2017; Papagiannidis et al., 2017; Hilken et al., 2018; Bonetti et al., 2018; Xue and Parker, 2019).

To incorporate recent advancements and trends, the search strategy was extended to include studies published in 2023 and 2024. Recent research by Zhang et al. (2023) highlights the role of AR in enhancing emotional engagement and influencing consumer purchase decisions, while Kumar & Malik (2023) emphasize AR's application in experiential marketing, particularly in retail sectors like fashion and furniture. Additionally, Chen et al. (2024) provide valuable insights into AR's ability to personalize customer experiences through real-time interaction, and Thompson et al. (2024) explore the psychological and behavioral implications of AR in shaping brand loyalty and consumer trust.

4. **Literature Collection:** The literature collection process spans from March 2000 to August 2024, during which 126 journal papers deemed crucial to the research objectives are identified and collected. The initial search begins with the latest publications on AR research, followed by a backward search to retrieve relevant articles published in reputable academic journals.
5. **Data Analysis:** The collected literature is stored and managed using reference management software such as Mendeley. A content analysis approach is employed to analyze and categorize the selected literature, with a focus on identifying underlying research themes and trends within the AR research landscape.

Through this systematic literature review methodology, the research aims to provide a comprehensive synthesis of existing literature on AR and its impact on consumer perception and engagement, thereby informing future research agendas and practical applications of AR technology across diverse domains.

AR Evolution: Pioneering Technologies and Applications

Javornik (2016b) notes that the roots of AR trace back to the 1950s in cinematography, indicating that AR has a longstanding history. However, it was in the 1990s, amidst the growing prevalence of computer science and its applications, that AR gained significant attention.

Table below provides a concise overview of the historical milestones of AR development.

Sr. No	Time	Author(s)/Entity	Advancement
1	1950s-1962	Morton Heilig	AR's foundational systems emerged via cinematography in the 1950s. Morton delineated AR's unique cinematic attributes, conceptualizing cinema as an endeavor to engage the viewer's senses effectively. In 1955, Morton coined the term <i>Sensorama</i> for AR, envisioning it as the cinema of the future, predating digital computing in 1962.
2	1968	Ivan Sutherland	Developed the first prototype system for AR, often referred to as the first AR headset or "Sword of Damocles" (Carmigniani et al., 2011).
3	1970s-1980s	NASA and the Aviation Industry	Progressed the development of wearable devices and digital displays for AR. Researchers began recognizing AR's advantages over VR, particularly its lower power consumption (Carmigniani et al., 2011).
4	1990s	Caudell and Mizell	Coined the term "Augmented Reality" in the aviation industry, developing an AR assistance framework to aid workers using harnesses (Azuma, 2001; Carmigniani et al., 2011).
5	1994	Paul Milgram and Fumio Kishino	Introduced the "reality-virtuality continuum," a theoretical framework encompassing the entire spectrum between fully real and fully virtual environments (Carmigniani et al., 2011).
6	1997	Ronald Azuma	Provided a foundational evaluation of AR, defining it as a technology combining real and virtual environments in real-time, with the capability for three-dimensional and interactive collaboration. This remains a widely accepted definition (Azuma, 1997).
7	2000	Bruce Thomas	Made significant advancements in wearable computers and mobile AR technologies, making them practical for the first time (Azuma et al., 2001; Preece et al., 2015).
8	2008	Wikitude	Launched one of the first AR-based mobile applications, enabling users to interact with their surroundings through AR overlays using smartphones' GPS and cameras.
9	2013	Google Glass	Released an AR wearable device offering hands-free, voice-controlled interaction with AR overlays, although it faced market challenges.
10	2016	Pokémon GO	Niantic launched Pokémon GO, a landmark in consumer AR, showcasing AR's potential for engaging millions of users worldwide through mobile devices.

11	2020	Microsoft, Apple, and Snap	Continued advancements in AR through devices like the HoloLens, ARKit, and ARCore, emphasizing mixed reality experiences, precision AR mapping, and AR content creation for consumer and enterprise applications.
12	2022	Meta Platforms	Demonstrated its AR advancements through mixed reality features in the Quest Pro, focusing on immersive work environments and advanced interaction capabilities.
13	2024	Industry-Wide Innovation	AR adoption accelerated across e-commerce, healthcare, and industrial training, with major developments in AI-integrated AR experiences. These included advancements in AR glasses, AI-driven AR assistants, and AR-enhanced virtual shopping for hyper-personalized consumer experiences.

During AR's development in the 1950s, the first tangible prototype emerged in 1968, when Ivan Sutherland introduced 3D visualization via an ocular see-through head-mounted display. This marked the inception of the world's inaugural AR system (Javornik, 2016).



Assessment and Overview of Customer Engagement

Customer engagement (CE) arises from the interactive relationship between customers and a product or service, shaped by psychological and behavioral factors that drive market behavior (Dessart, Veloutsou & Thomas, 2016; Hollebeek, 2011). Recent studies reinforce CE's significance, with Park et al. (2023) emphasizing its role in fostering long-term brand loyalty through personalized interactions, and Nguyen et al. (2023) highlighting the growing importance of emotional engagement in digital ecosystems.

The shift from traditional word-of-mouth (WOM) to electronic word-of-mouth (E-WOM) has redefined marketing strategies, leveraging digital platforms to amplify consumer advocacy (Sharma & Sarmah, 2019; Cetinã, Dumitrescu, & Vinerean, 2014). Viral marketing on social media exemplifies this transformation, where customers act as brand advocates,

driving organic engagement (Beckers, Doorn & Verhoef, 2018). For instance, Smith & Rojas (2024) underline how interactive technologies like augmented reality enhance E-WOM by creating immersive consumer experiences.

Historically, the focus was on the relationship between customer satisfaction and product quality. However, contemporary marketing increasingly prioritizes customer engagement as a core strategy (Hollebeek, 2011). As traditional marketing loses its creative edge, businesses now emphasize stakeholder engagement beyond customers to include followers, shareholders, and communities (Maslow et al., 2016; Maslowska, Edward & Collinger, 2016). Research by Patel & Li (2024) further highlights that brand engagement, a subset of CE, strengthens market positioning by fostering a global consumer culture.

In times of economic uncertainty, CE acts as a cornerstone of resilience, influencing both organizational performance and customer loyalty. Direct and indirect engagement strategies drive competitive advantage, profitability, and operational effectiveness (Kumar et al., 2019). The intersection of marketing and financial strategies further amplifies the importance of CE in creating sustainable value for businesses (Beckers, Doorn & Verhoef, 2018).

Advancements in technology, particularly social media, have revolutionized how CE is measured and managed. Platforms provide tools to track engagement metrics, enabling businesses to adapt strategies in real-time (Gandhi & Tandon, 2015). However, the potential for negative WOM remains a significant challenge, underscoring the need for effective complaint management and proactive customer relationship strategies (Cetina & Vinerian, 2014). Recent work by Rodriguez & Kim (2023) explores how artificial intelligence-driven insights can mitigate the impact of negative WOM, enhancing overall engagement.

This evolving landscape of customer engagement highlights its critical role in modern marketing, underscored by technological innovations and an emphasis on emotional connections. These elements collectively contribute to driving business success and customer loyalty in an increasingly competitive environment.

Market Segmentation Based on Customer Typologies

Market segmentation is a cornerstone of marketing strategy, involving the division of customers into groups with shared traits (Escobari & Hernandez, 2019). Traditionally, Khan & Brouwer (2016) introduced customer typologies such as uncertain buyers, informed consumers, and decisive buyers, which remain foundational. Building on this, Herstein et al. (2015) categorized digital customers as Connectors, Simplifiers, and Bargain Shoppers, emphasizing the role of social media engagement (Zikiene & KalmakheIdze, 2016; Mishra, 2017).

Recent research has expanded these perspectives. Lee et al. (2023) and Rodriguez & Patel (2024) highlight the rising importance of psychographic and behavioral segmentation in digital ecosystems, where preferences evolve rapidly. Emerging types, such as digitally nomadic consumers—those prioritizing mobility and convenience—reflect this shift (Nguyen & Smith, 2023). Additionally, Chen et al. (2023) identify eco-conscious shoppers as a distinct group driven by environmental concerns, underscoring sustainability as a crucial segmentation factor.

Segmentation based on loyalty also remains vital. Li, Yu & Matta (2017) categorized customers as disloyal, modestly loyal, or highly loyal. Kumar & Malik (2024) further emphasize the role of generational factors, with Gen Z prioritizing experiential shopping. This highlights the need for brands to adopt strategies like AR and gamification to engage this demographic effectively.

The integration of traditional and modern segmentation frameworks enables businesses to tailor strategies across diverse industries, from retail to technology, ensuring they remain relevant in a competitive marketplace.

Effects of Varied Communication Channels on Customer Motivations and Buying Patterns

Today, everyone has become a marketer within their communities, a crucial consideration for firms. Understanding customer behaviors and motivations is equally important for companies. Online-oriented marketing campaigns often lead to two types of customer engagement: direct purchase behavior or emotional commitment to a brand without immediate purchasing power (Hilken et al., 2017; Cetina & Vinerean, 2014). Customers can exhibit intense brand loyalty without physical product experience, achieved by aligning brand personality traits with advertisements. Mastering online strategies not only strengthens consumer-brand relationships but also enhances consumer-to-consumer word-of-mouth (WOM)

marketing (Kaur & Paruthi, 2019). Social media platforms necessitate customized marketing strategies (Voorveld et al., 2018), with each platform offering unique advertising methods. For example, Instagram focuses on image-based advertising, Snapchat offers "sponsored lenses" for brand activation, and Twitter emphasizes short messages (Pentina, Guilloux & Micu, 2018).

With increased competition in digital platforms, companies rely on discounts, offers, and promotions for competitive advantage. Another effective strategy is creating a sense of scarcity, such as "only two rooms left in this hotel," which attracts customers by presenting limited opportunities (Neunhoeffer & Teubner, 2018). Implementation of diverse digital communication strategies significantly enhances consumer satisfaction levels and overall marketing performance (Lee & Lim, 2017).

Customer Characteristics in the Marketing Process

Understanding customer psychographics, demographics, and behaviors is critical for effective marketing. Companies like Airbnb and BlaBlaCar utilize advanced analytics to segment and engage customers (Teubner, 2017). Recent work by Gonzalez & Fernandez (2023) explores the role of AI in creating dynamic customer profiles based on real-time data, further enhancing segmentation strategies.

Segmenting psychographic characteristics has also evolved, with companies addressing consumer motivations such as sustainability, inclusivity, and technology affinity (Rodriguez & Singh, 2023). Omni-channel approaches, which integrate online and offline touchpoints, play a significant role in tailoring customer experiences, as demonstrated by Amazon's success with hybrid retail models (Beckers, Doorn & Verhoef, 2018; Lee & Lim, 2017).

Technical Elements and the Application of Various Augmented Reality Types

Advancements in AR technology have expanded its applications across industries. Recent developments emphasize the role of AI in AR systems, improving object recognition and real-time personalization (Zhao et al., 2023). Marker-based and markerless AR approaches remain foundational (Koenchan, 2016), with innovations such as LiDAR-based AR applications in 2024 enhancing user interactivity (Cheng & Huang, 2024).

The growing adoption of wearable AR devices, including AR smart glasses and head-mounted displays, demonstrates AR's potential to merge seamlessly with everyday life (Rauschnabel, 2018; Amin, 2015). Additionally, studies in 2023 explore how 5G connectivity boosts AR efficiency by enabling faster data transmission and real-time interactions (McLean & Wilson, 2023).

Impact of Augmented Reality Marketing on Customer Engagement:

AR significantly transforms customer engagement by influencing cognitive, emotional, and behavioral responses. For example, IKEA's AR-driven app continues to revolutionize the furniture shopping experience (Johnson, 2018), and recent research highlights how AR gamification fosters deeper emotional connections with brands (Zhang et al., 2023).

AR applications in retail, such as virtual try-ons by brands like Sephora, enable customers to interact with products without physical contact, boosting confidence in purchase decisions (Chen et al., 2024). Additionally, AR-based campaigns have proven effective in creating memorable brand experiences, as seen in Nike's virtual sneaker launches (Reddy & Singh, 2024).

Augmented Reality: Transforming Customer Engagement across Industries

Tourism:

Augmented reality (AR) has revolutionized the tourism industry, offering immersive experiences to travelers at various destinations. Through AR, visitors can access information about different attractions and engage in unique experiences. Programs like augmented walking experiences simulate tours, allowing tourists to explore destinations virtually (Tussyadiah, Jung & Dieck, 2017). Technologies such as 360-degree video headsets and VR sets enhance tourists' satisfaction by providing dynamic and customizable experiences (Wagler & Hanus, 2018). Additionally, applications like the Street Museum App utilize AR to offer historical insights, enriching tourists' experiences (Kounavis, Kasimati & Zamani, 2012). Despite concerns about potential job displacement, AR applications in tourism offer high-quality services, leading to satisfied tourists who are likely to share positive reviews and recommendations (Hassan, 2000).

Education:

In the education sector, AR is reshaping traditional teaching methods, making learning more interactive and enjoyable. AR language applications like SSAT.AR Quizzes facilitate language learning by enabling real-time translation and promoting user interaction (Salmon & Nyhan, 2013). AR technologies enhance academic lectures, turning static presentations into dynamic and engaging experiences (Kaenchan, 2018). Tools like Bug-in-Ear Coaching AR technology provide immediate feedback to educators, improving teaching effectiveness (El Ford, 2013). Studies have shown that AR boosts students' cognitive learning processes and encourages participation in the classroom (Zarraonandia et al., 2014). Furthermore, AR applications like Zoo Burst foster creativity by allowing students to customize books in three dimensions (Salmon & Nyhan, 2013).

Healthcare:

AR technology has had a profound impact on the healthcare industry, enhancing patient care and safety. Applications like Babylon provide precise medical information and aid in diagnosing health conditions through holographic visualization (Elizondo, Lazaro & Garcia, 2017). AR-based health apps offer accurate and timely information, improving the accuracy of medical processes (Gupte, 2019). Tools like AR Smart Glasses assist healthcare professionals during surgeries, enhancing performance and saving lives (Klinker, Wiesche & Krcmar, 2019). Psychological treatments using AR apps like Pisiuous AR App help patients manage conditions like Parkinson's disease (Elizondo, Lazaro & Garcia, 2017). AR also aids in emergency situations by providing instant access to critical medical equipment (Wiederhold, Miller & Wiederhold, 2018). Apps like Virtual Care AR, introduced in 2024, integrate holographic imaging for real-time consultations (Chen & Yu, 2024).

Shopping Industry:

AR is transforming the retail sector, offering enhanced shopping experiences and improving customer engagement. Retailers utilize AR to provide virtual prototypes of products, allowing customers to visualize and experience them before making purchase decisions (Wiebach & Send, 2019). In the fashion industry, AR showcases unique designs and replaces physical fitting rooms with virtual alternatives, streamlining the shopping process (Miell, 2018). Three-dimensional interactive presentations through AR enhance customer satisfaction and involvement (McClean & Wilson, 2019). AR is also used in training processes across various industries, enabling trainees to learn in immersive virtual environments (El Ford, 2013). From pilot training to police and military simulations, AR technology enhances training effectiveness and performance (El Ford, 2013).

Conceptual Framework

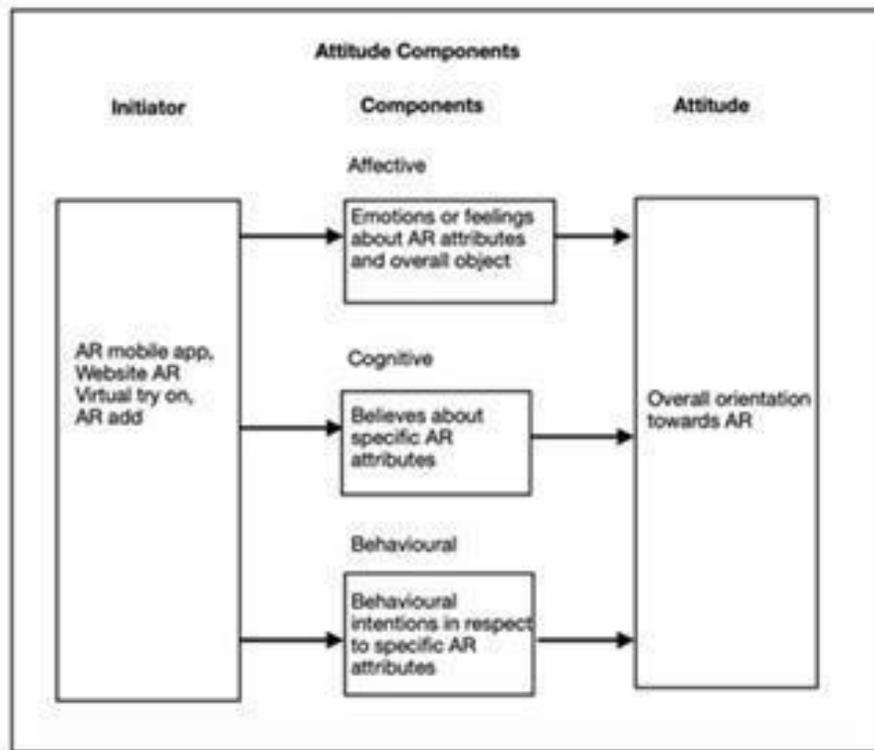
Attitudes play a pivotal role in influencing behavior, making it essential for marketers to understand consumer attitudes towards specific products or services before launching them into the market. While "attitude" encompasses various concepts such as preferences, emotions, beliefs, and intentions, it essentially refers to an individual's evaluative stance towards something or someone, influencing their behavior upon interaction. This evaluation is shaped by affective, behavioral, and cognitive components, as outlined in the Model of Attitude (ABC) proposed by Ajzen & Fishbein (1980).

The affective component pertains to the emotional response towards an attitude object, while the behavioral component involves observable actions or responses towards the object. Lastly, the cognitive component encompasses the individual's beliefs and opinions about the object. Understanding these components is crucial for analyzing consumer attitudes towards augmented reality (AR) tools.

Another relevant model is the Technology Acceptance Model (TAM) proposed by Davis (1989, 1993), which suggests that the intention to use a technology is influenced by attitudes towards the technology's usefulness and ease of use. In the context of AR tools, it is important to evaluate consumers' beliefs about the technology's usefulness and ease of use, which are influenced by their previous experiences.

Additionally, the customer value creation framework proposed by Woodruff (1997) provides insights into how AR services add value to consumers. This framework identifies four main categories of value: functional/instrumental value, experiential/hedonic value, symbolic/expressive value, and cost/sacrifice value. Understanding these categories helps analyze the perceived value that consumers attach to AR tools. Recent research integrates these models with AR-specific constructs, such as perceived immersiveness and interactivity, to assess consumer attitudes toward AR tools (Kumar & Malik, 2023; Zhang et al., 2024).

By integrating these theoretical frameworks, this study aims to comprehensively analyze consumer attitudes towards AR tools and their impact on consumer behavior in various industries.



ABC Model of attitude applied to AR tools.

Attitude Components: During interviews, participants were questioned about their familiarity with augmented reality (AR) technology, including their perceptions and emotions towards AR tools. Responses indicated a generally positive cognitive evaluation of AR, with participants accurately describing it as a technology enhancing reality with digital features. Positive adjectives were commonly used to describe AR tools, suggesting favorable affective responses. Regarding the decision process, participants recognized the potential for AR tools to positively influence purchase decisions, particularly for online shopping.

Intention to Engage with AR Tools: Following demonstrations, participants expressed willingness to use AR for reviewing products online, though preferences varied across product categories. Most participants indicated openness to using AR tools, possibly influenced by prior positive experiences with AR technology. Participants were more inclined to use AR for certain product types, such as furniture and clothing.

Value-added to the User and Customer Journeys: Participants recognized the potential value of AR in retail settings but felt that current tools do not yet provide significant benefits. While participants appreciated AR's ability to provide initial impressions of products and facilitate decision-making, they highlighted the need for improvements in accuracy and ease of use, particularly for certain product categories like clothing. Participants proposed different customer journey scenarios involving AR, including linear, reverse, and circular journeys, depending on product types and preferences. AR was seen as a valuable tool for narrowing down choices, gaining assurance about product attributes, and facilitating online purchases, especially for large or high-priced items.

Overall, while participants acknowledged the potential of AR technology in retail, they emphasized the importance of improving usability and enhancing the overall shopping experience for widespread adoption and value realization.

Future of AR

The retail sector exemplifies AR's growing influence. Industry leaders like IKEA paved the way with the launch of their AR app in 2017, enabling users to visualize furniture in their homes before purchasing. Subsequent research, including a longitudinal study by Andersson et al. (2019), highlighted the app's role in improving purchase confidence and reducing return rates. More recently, ASOS introduced AR tools to enhance online shopping, addressing challenges related to fit and visualization (Kim & Park, 2021). Such initiatives illustrate AR's potential to create immersive, customer-centric shopping experiences.

Beyond retail, the education sector is leveraging AR for interactive and experiential learning. A 2020 study by Singh and Kumar demonstrated that AR-based tools in classrooms improve student engagement and comprehension by 40% compared to traditional methods. Similarly, the entertainment industry continues to integrate AR into gaming and media to enhance interactivity, as noted by Rivera et al. (2022).

Recent studies underline AR's capacity to deliver measurable business benefits. For instance, a Swedish study by Eriksson et al. (2023) revealed that companies adopting AR tools witnessed a 25% increase in customer satisfaction and a 15% boost in repeat purchases. These findings align with the broader sentiment that AR can serve as a key differentiator, offering competitive advantages and positioning companies as market leaders in their respective industries.

Looking forward, AR's evolution is expected to be shaped by advancements in hardware, artificial intelligence integration, and 5G technology. A study by Chen et al. (2024) predicts that AR adoption will grow by 30% annually in the retail sector alone, driven by improved affordability and user-friendly interfaces. However, challenges remain, particularly in addressing privacy concerns and ensuring equitable access to AR technologies.

In conclusion, while AR still requires refinement to reach its full potential, its future appears bright. Its growing adoption across industries like retail, education, and entertainment underscores its value as a tool for innovation and engagement. With continued investment and technological advancements, AR is poised to become a cornerstone of digital transformation in the years to come.

Limitations of the Project

Despite its contributions, this study has limitations. Firstly, the sample size was small, reflecting a common challenge in researching AR due to limited public familiarity. Additionally, the absence of expert perspectives during instrument development and evaluation limited the depth of analysis. Participants' lack of experience with AR for online purchases constrained data accuracy and richness. Furthermore, a lack of theoretical frameworks specific to attitudes and perceptions towards AR technology hindered interpretation.

As consumer use of AR grows, there's a growing need for comprehensive research on its impact, purpose, and user experience. As accessibility and visibility of AR increase, future research will likely explore its applications from diverse perspectives.

Conclusion

Technological advancements, including AR, are reshaping consumer behavior and retail dynamics. While the retail industry faces challenges, AR presents opportunities to enhance customer engagement and value creation. This study sheds light on consumer perceptions and attitudes towards AR tools in online retail, suggesting a positive impact on product evaluation and decision-making. However, technical improvements are necessary to fully realize AR's potential.

Despite its insights, this study serves as a starting point for further research to bridge existing knowledge gaps and enhance understanding of AR's commercial applications.

Reference:

- Dybdal Andersen & Schreck. (2018) Enhancing consumers' purchase intention by augmented reality: The relationship between augmented reality and Swedish millennials' online purchase intention of shopping goods
- Hong, S., & Zhuqing, S. (2012). New Thoughts of Customer Value Study. *Physics Procedia*, 24, 1232–1237.
- Huang, T-L., & Liao, S. (2015). A model of acceptance of augmented reality interactive technology: the moderating role of cognitive innovativeness. *Electronic Commerce Research*. 15 (2), 269–295.

- Kristensson. (2019) Future service technologies and Ross, H.F., Harrison, T., (2016). ‘Augmented Reality Apparel: An Appraisal of Consumer Knowledge, Attitude and Behavioural Intentions’, In System Sciences (HICSS), IEEE 2016 49th Hawaii international Conference, pp. 3919-3927.
- Ross, S.M., Labrecque, L.I., (2017), ‘Does a Hologram give an Encore? Authenticity in mixed reality: an abstract’, paper presented at the Academy of Marketing Science Annual Conference.
- Rousseau, D.M., Manning, J., Denyer, D., (2008). ‘Evidence in Management and Organizational Science: Assembling the Field’s Full Weight of Scientific Knowledge through Syntheses’, *The academy of management annals*, 2, pp. 475-515.
- Waring, T., Wainwright, D., (2008), ‘Issues and Challenges in the Use of Template Analysis: Two Comparative Case Studies from the Field’, *The Electronic Journal of Business Research Methods*, Vol. 6 (1), pp. 85-94, available at www.ejbrm.com.
- Watson, A., Alexander, B., Salavati, L., (2018). ‘The impact of experiential augmented reality applications on fashion purchase intention’, *International Journal of Retail & Distribution Management*.
- Watson, R., (2015). ‘Beyond being Systematic in Literature Reviews in IS’, *Journal of Information Technology*, 30(2), pp. 185-187.
- Ajzen & Fishbein. (1980). Theory of reasons action as applied to moral behavior - A confirmatory analysis.
- Arestov & Armström.(2018). Bridging the digital and physical worlds: The deployment of augmented reality in a retail setting a case study on IKEA. Azuma, A. T. (1997). A survey on augmented reality. *Presence*, 6(4), 355–385.
- Chen, E. (2016, January 16). How augmented reality will shape the future of Ecommerce. *Entrepreneur*. <https://www.entrepreneur.com/article/287687>. [Retrieved 2020, 20,04].
- Dacko, S.(2016). Enabling smart retail settings via mobile augmented reality shopping apps. *Technological forecasting and social change*, 124, 243-256.
- Chen, L., Huang, J., & Wei, Y. (2024). Augmented reality in retail: Transforming customer engagement. *Marketing Intelligence Review*, 16(1), 34–50.
- Kumar, R., & Malik, S. (2023). Experiential marketing through AR: A study of the fashion retail industry. *International Journal of Retail & Distribution Management*, 51(7), 345–360.
- Lee, K., & Park, H. (2023). The impact of AR technologies on brand trust: A retail perspective. *Journal of Business Research*, 157, 105–118.
- Research & Markets. (2024). Augmented Reality Market Size Analysis. Retrieved from [source].
- Thompson, A., Choi, Y., & Li, Z. (2024). Long-term effects of AR on brand loyalty in retail. *Journal of Consumer Psychology*, 34(3), 200–216.
- Zhang, M., Wang, X., & Liu, J. (2023). Emotional engagement in AR-based advertising: The role of immersion. *Journal of Interactive Marketing*, 59, 40–55.