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Transforming Consumer Interaction: The Role Of Augmented Reality (Ar) Technologies Shaping Consumer Experience Across Diverse Sectors

Ms. Anjali Mehta[1], Dr. Manisha[2] and Dr. Sanatan Tiwari[3*]

[1]Student, Department of Commerce, University of Delhi
[2]Assistant Professor, Department of Commerce, University of Delhi
[3]Assistant Professor, Janki Devi Memorial College, University of Delhi
mehta.anjalib@gmail.com[1], manisha@commerce.du.ac.in[2] and sanatan@jdm.du.ac.in[3]
OrcidId: 0000-0002-5012-7857[2] and 0000-0003-3760-1670[3]
Corresponding Author: Dr. Sanatan Tiwari

Consumers are driven by experiences. They tend to touch, feel, smell, taste, and try products before they make any purchase. The most crucial factor motivating marketers to get better every day is customer experience (Fashinza, n.d.). The largest drawback of Indian online retail establishments in the context of internet marketing is their inability to provide clients with a true experience with theproduct or service (Thomas S., Investigating interactive marketing technologies –adoption of augmented/virtual reality in the Indian context, 2021).

These modern consumers have an option of having a holistic shopping experience which not only has their visual appeal but triggers their maximum senses because of AR. AR is seen as existing somewhere amid the real and virtual world and it has enhanced the retail engagement by making it even more experientially immersive, engaging, and personal. Augmented Reality focuses on consumer buying behaviour so that consumers are no longer able to tell the difference between in-store and online shopping experiences. As a result, AR is becoming more widely accepted in the highly competitive Indian market because it improves the way we see, hear, and feelthe product and incorporates parts of the virtual world into reality. Consumers intend to try new products (Thomas, 2021). When they require less time to try and use the products it creates delight in customers. This improves the online buying experience and eventually increases revenue for the brand.

Technology's arrival and the rise in smartphone usage have forced marketers all over the world to embrace augmented reality. Additionally, adoption of AR technology is quite visible in the sectors that are closer to urban Indian consumers such as the apparel, jewellery, footwear, eyewear, and even food businesses (Choudhary, Sriram, & Routray, 2015)**.**

The focus of the study is on understanding the current usage of AR applications and the scope ofAR technologies in the Indian market. The insights from the investigation will help to gauge the possible adoption level of AR by Indian companies in various consumer goods segments. The study also aims to understand the challenges associated with adoption of AR and suggest remedies to tackle.

Keywords – augmented reality; technology adoption; shopping experience; consumer behaviour.

INTRODUCTION

Augmented reality is nothing but an "added reality" i.e., it adds an additional layer to the real world. It began with using AR technology to present information on the screen (Clifford-Marsh, 2009) and now the technology is used for showcasing products more realistically by creating an immersive online shopping experience that resembles being in a physical store. This is done by providing consumers with multi-sensory experience. Although taste and smell are not yet fully included in augmented reality technology, these senses can nevertheless be stimulated by sights and music (Unified AR, n.d.).

Augmented Reality (AR) has rapidly advanced from a specialized technology to a game-changing instrument in variousindustries worldwide. By overlaying digital content onto the real world, AR creates immersive and interactive experiences that enhance user engagement, decision-making, and operational efficiency. Globally, AR has seen widespread adoption in sectors such as retail, healthcare, education, and manufacturing, revolutionizing traditional processes and consumer interactions (Circuit Stream, 2022).India, although in the preliminary stages of AR adoption, holds immense potential for leveraging this technology across multiple sectors, driven by a growing digital infrastructure and an increasing consumer demand for innovation (Statista Market Insights, 2024).

AR is starting to take off in the Indian market, especially in the jewelry, insurance, and retail industries.Prominent Indian companies like Lenskart have incorporated augmented reality (AR) technology intotheir online stores, allowing users to virtually put on eyewear. This has improved consumer satisfaction and increased online sales (HT Tech, 2023). Tanishq, a well-known jewelry brand has similarly used augmented reality (AR) to create virtual jewelry try-ons, bridging the gap between online and offline buying (Exchange4Media, 2019). In addition, ICICI Lombard has implemented AR-based insurance claim processing solutions which increase productivity and cut down on time spent on manual inspections (ICICI Lombard, n.d.). Sony Pictures Entertainment Films India used innovative AR (Augmented Reality) ad campaign, to promote the 2019 film "Men in Black: International". The sensoryrich media used during the promotions improved audience engagement and produced immersive experiences (mCanvas, 2019).

According to industry studies, three out of five consumers are always wearing the wrong size shoe. Nike receives more than 500,000 inquiries a year regarding sizing, and that the primary reason for shoe returns is size, regardless of whether they were bought in-person or online. Therefore, the company launched an app Nike Fit that will scan customer's feet in real time and tell the exact shoe size (Thomas L., 2019).

Even though AR does not fully support touch, shops may nevertheless evoke a sense of movement and texture. For instance, tracking technology enables virtual try-ons of clothes that move with models on a virtual runway and magnified views of rug fibers to depict their texture. These components give consumers haptic details about the feel of the things they are considering buying online. For example

– Nalli provides high definition photos of clothes to allow consumers understand the product

better.

Augmented reality has immense potential in India which houses third-highest number of online shoppers after the US and China who are the top two (Times of India, 2022). Businesses will confrontadditional difficulties in 2024 as a result of consumers' growing interest in digital innovation and their growing expectations for high-quality purchasing experiences. Thus, companies will need to adapt to the change brought about by Augmented Reality (Miller, 2024).

LITERATURE REVIEW

Augmented Reality (AR) as defined by Craig, 2013 is "an environment in which digital information, which is both spatially and temporally registered with the physical world and interacts in time, is placedon the physical world". With changes in the marketing landscape companies are adopting innovative methods to draw in customers, encourage interaction, and develop brand loyalty (Tushar et. al.,2023). The Google Maps live view function is a perfect example of how users may visualize their destinations in real time with the help of AR.

Augmented Reality applications enable consumers to interact with the items in new ways and help propagate captivating brand narratives (Smith & Scholz, 2016). However, consumer shopping can be further improved with the use of immersive technology such as AR useable via a camera on devices such as mobile phones, tablets etc. (Widjaja, Ha, Ruangsri, & Chen, 2021; Hilken et.al. 2017; Jiang and Benbasat 2005; Pantano and Servidio 2012; Verhagen et. al., 2014). AR applicationimpact is turned into increase in their sales (Pantano & Servidio, 2012).

Consumer-led interactions with AR mostly happen through mobile applications (Mccormick & Magrath, 2013). Input devices (e.g. mouse, keyboard) are now being substituted by AR-enabled user interactions in the form of gestures (e.g. swiping, tapping) enhancing user experience (Pamporis & Alshaal, 2016; Alshaal et. al., 2016).

Consumers can also access in-store AR applications through mirrors that have been digitally augmented for fitting purposes, interactive visualization of products and to provide product placement in the store, tailored offers, and suggestions (Zagel, 2016).

Different viewpoints emerged about adopting AR by retailers because of cost and time consumption during implementation and generating brand value while achieving minimal returns on investment (Milnes, 2016). Despite these reservations, it is now anticipated that the AR market would reach US$85 billion by 2025, with the retailing sector accounting for US$11.4 billion of that total (Kumar, Rauschnabel, Agarwal, Singh, & Srivastava, 2023).

Investigating the use of augmented reality (AR) in marketing tactics has produced fascinating findings about how it affects consumer experience and brand engagement (Du et. al., 2022; Rejeb et. al., 2023; Nawres et. al., 2024; Hsu et. al., 2024). The reason experiential AR advertisements get so much attention is because they provide a unique and unusual customer experience (Russell, 2012).

Influence is only one aspect of customer engagement; collaborations are another. Therefore, direct communication and active involvement allow customers to feel involved in the

company's continuous development (Johnson et. al., 2021).

Additionally, multi-senses experiences such as audio, video, and sensory which are made possible through in-store hardware tools make customer experience more engaging. According to research, 40% of customers are likely to buy a product with optimal AR experience (Binmile, 2024).

This is supported by Cruh, 2017 which mentions that 89% of market leaders believe that customer experience gives their company competitive differentiation over others.

In general, getting users to respond favourably to new technology depends on their understanding of how to use it and how it functions (Alexa, 2023). This promotes their acceptance perceived utility, perceived ease of use, and perceived intuitiveness of technologies while the reverse might even result in annoyance and discontent (Lee et. al. 2012).

The user penetration rate for India is predicted to be 51.2% by 2029 with 770.3m users which is currently at 42.1% (Statista, 2023). Customers in the age group of 18-24 years are more likely to use technology while shopping. However, as per Deloitte, 43% of customers do not know which technologies will make them more loyal but they prefer personalisation (The Deloitte Consumer Review, n.d.). Nevertheless, AR has potential for marketers to adopt the technology and make customers more loyal by providing customised and engaging experiences.

USE OF AR IN VARIOUS INDUSTRIES

TOURISM

Augmented reality (AR) is transforming the way we travel and engage with the world. It has enormous potential to provide tourists with a whole new perspective on how to discover and interactwith their surroundings (Rock Paper Reality, 2023).

In the modern world, an increasing number of tourists are using technology to enhance their travel experiences and make them more convenient. For this reason, the travel and hospitality sectors haveinvestigated how to use innovative apps to empower passengers (Truyols, 2023). The possibilities of Augmented Reality in tourism are endless and facilitate people in the form of personal recommendations and interactive maps to remote assistants and translation apps. Travelers can receive experiences and information from augmented reality apps that are customised to their requirements and tastes (Truyols, 2023). For instance, they can provide the travelers with tailored suggestions for things to do or restaurants they can visit when travelling to a certain place.

Immersion technologies have grown in popularity recently across several industries, including travel. Theme parks, museums, historical sites, and other tourist and hospitality venues are implementing augmented reality (AR) and virtual reality (VR) (Wei, 2019). As Höllerer and Feiner observed in their study, travellers can now swiftly find locations, gather background information, and explore an infinite number of alternatives, restricted only by the capabilities of AR technology (Höllerer & Feiner, 2004).

Travel agencies, tour companies, and destinations can use augmented reality (AR) to give visitors a more customized experience, improving client satisfaction and meeting their ever-

changing needs (Truyols, 2023).

People travel to understand about society's culture and civilization from antiquated relics contain priceless knowledge. However, due to their fragility and size, they are frequently not properly kept orare inaccessible (Boboc, Băutu, Gîrbacia , Popovici, & Popovici, 2022). In the times of natural disasters and deliberate human criminal activity there is greater need for managing and protecting this cultural heritage. This can be tackled by increasing AR usage that can help in precisely building a digital heritage by digitising and duplicating these artifacts, offering the heritage a fighting chance to survive (Boboc, Băutu, Gîrbacia , Popovici, & Popovici, 2022). In this sense, AR can revive historical events (Boboc, et al., 2019) and at the same time aid in their conservation, and preservation (Merchán, Merchán, & Pérez, 2021).

Historical sites reflect the history, and the customs of those who have resided and worked in a particular location, and form part of intangible cultural heritage (ICH) which holds importance to every community related to the place. Cataloguing the details about it and the objects, including its material,shape, function, and history in methodical way could also be done with the help of AR which will makeinformation easily available. In this manner digital solutions could support and safeguard the intangible cultural heritage of the tourist places and historical sites (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023). An AR-based application can also be used for teaching a design course in educational settings.The software has been shown to boost kids' confidence and help them focus and learn on their own (Chang, 2021).

AR could also be used for enhancing the Improving the experience of investigation, reconstruction, and travel at various sites (Okanovic, et al., 2022). As concerns for sustainability are growing, augmented reality (AR) applications may be vital in teaching visitors the value of protecting the environment and conserving natural and cultural heritage (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023). This will enhance the visitor experience while delivering their information at the same time (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023).

There is an increasing need for the creation of virtual and distant tourism experiences considering the post-COVID-19 environment (Akhtar, et al., 2021, p. 13). There is however a dearth of study on the application of AR technology to enhance haptic, olfactory, and gustatory content in tourism because to considerations like technological limits, accessibility, and user acceptance (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023).

Galleries, libraries, archives, and museums should also create multisensory experiences that engage visitors with special consideration to addressing accessibility difficulties for those who have hearing impairments or other limitations by utilizing AR technologies (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023).

HOSPITALITY

The hotel industry is dominated by the experience economy. Travelers seek out experiences that will change their lives, not just a place to sleep in places where they stay. AR can help make these experiences morememorable and enjoyable by tailoring these guest interactions (Bettencourt, 2023).

One of the earliest instances of augmented reality being used in the hospitality industry was a projectthat Holiday Inn carried out in 2012 for the London 2012 Olympic and Paralympic Games. Through out the hotel, guests could snap pictures at different areas with their digital representations of the Olympic competitors and watch them compete using cell phones (Manjavidze, 2022).

Hotels have since then been providing immersive and interactive previews to customers using AR technology. It is observed that AR usage enhances the hotel booking experience, increases the visitors' happiness and improves the chance that they will stay and return. Some firms leverage AR by offeringinteractive hotel rooms so that clients may have a better understanding of the accommodation. Thisallows customers to explore the venue's surroundings, check out the guestroom in real time, and takea 360-degree virtual tour of the space before they even set foot in it thanks to the 3D model that represents the room (Lim, Jasim, & Das, 2024).

Applications for augmented reality can also be quite helpful for hotels hosting foreign guests who couldfind it difficult to converse effectively due to different language backgrounds. Visitors will only need toaim their cell phones at the menu or any of the available guides to obtain pertinent information in a language that suits them. By utilizing this option, the hotels will facilitate their visitors from any nation, regardless of language barrier, can enjoy a comfortable stay (Lim, Jasim, & Das, 2024). This remains the greatest application of AR in this industry. To optimize AR/VR's benefits, hoteliers should look for ways to successfully integrate technology into their offerings (Lim, Jasim, & Das, 2024).

Although larger hotel chains have started to adopt AR, many smaller hotels and tourism companies have yet to incorporate this technology into their operations. AR could allow smaller businesses to offer virtual tours and interactive maps to enhance the guest experience (Proven Reality, 2024). Additionally, local tourism operators could provide AR-driven historical or cultural tours that add valueto their services by overlaying information directly onto physical landmarks (Truyols, 2023).

Indian hotel provider OYO also finds AR to play a big role in its expansion and in providing a competitive edge. Augmented reality will allow guests to make the right decision regarding selection of hotel by giving them a feeling similar to what they would experience when they stay in the hotel (Mathur, 2019).

Using augmented reality (AR) in the hotel and tourism industry can undoubtedly improve the travel experience and raise brand awareness. The individualized services offered with the help of AR will notonly be able to attract new clients but will also help in building strong base of devoted clients. Both guests and hotels stand to gain from the captivating experience as they solidify or expand their position in the market (Manjavidze, 2022).

The prior hospitality custom was centered on offering fundamental facilities and services to visitors. However, the experiences produced by this new era are engaging, memorable, and transforming ratherthan just functional. Though AR in hotel rooms is still in its early stages in India, these examples highlight the growing interest in creating tech-enabled, immersive experiences for guests. Given how quickly technology is developing and becoming incorporated into people's daily lives, it is only natural that augmented reality will take advantage of several opportunities in the hotel industry.

AR IN CONSTRUCTION

While larger firms in construction and real estate have started using AR for virtual walkthroughs and building simulations, many smaller firms have not adopted these innovations. AR could assist construction workers with blueprint overlays on physical sites, ensuring greater accuracy during the building process. Additionally, AR could improve client communication by allowing stakeholders to visualize project designs on-site or through interactive 3D models (Kowalski & Gupta, 2019).

Renowned Indian conglomerate Godrej engaged consumers and created a unique brand experience with its advertising campaigns by utilizing augmented reality (AR) technology. The company used augmented reality (AR) technology in its home security solution advertising campaigns to show off theeffectiveness of its goods (Boopathy, 2023).

Customers can see their home security systems in three dimensions as part of Godrej's augmented reality campaign, which explains how they work and how they could increase home security. Sales were successfully increased and interest in the company's products was piqued by the campaign. Godrej's creative use of technology, which enabled it to highlight its products as interesting and interactive, may be acknowledged for the campaign's success in augmented reality (Boopathy, 2023).

AR IN FMCG

The Fast-Moving Consumer Goods (FMCG) industry is adopting augmented reality (AR) increasingly to boost customer engagement, streamline marketing methods, and improve product interaction (Miller, 2024).

Cadbury Dairy Milk was the first FMCG product to integrate augmented reality (AR) in India. An augmented reality campaign was introduced by Cadbury India in 2013 to promote their Dairy Milk Bubbly chocolate bar. The Blippar app was used to carry out the campaign, enabling users to access interactive material by scanning the product's packaging. With this campaign, an FMCG brand in Indiaused augmented reality (AR) for the first time, giving customers a creative and interesting method tointeract with the brand (Sanina, 2011).

Parle carried out an AR advertisement in 2018 to appeal to millennials which are Frooti's main targetmarket (ET Brand Equity, 2018). The campaign was launched to establish strong brand recall when it comes to summertime enjoyment by providing the target group a taste of frooti life with the drink. Using facial recognition technology, the rich-media ad asked users to turn on their front cameras and record falling mangoes in their mouths in an augmented reality setting. With this unique adexperience, Frooti was able to leave a lasting impression on their audience (Business Insider, 2020).

In 2020, TATA Nx launched a creative mobile commercial to market their stevia-based sugar substitute sweetener, Tata Nx Zero Sugar, and to increase awareness of the amount of sugar used daily by the average Indian. Gamification and augmented reality were merged in the Tata Nx ZeroSugar campaign, which pushed consumers to search for and tap on products they often consume to find hidden sugar. In this way TATA was able to raise awareness about customers' consumption levels of sucrose and market its newest product, the NX Zero Sugar (mCanvas, 2020).

One of the biggest obstacles for FMCG in the fashion sector is the customer's fear that they won't "look good" in the product. For instance, a cosmetics company can provide an augmented reality experience to enable buyers see how their products might seem on them. This "virtual ty-on" reduces ambiguity and encourages more buying (Aircards, 2021).

Using virtual reality, Unilever took customers on a virtual tour to highlight their sustainability activities. Customers were able to observe firsthand the beneficial effects of Unilever's initiatives on the environment and society through this immersive experience. In addition to improving the brand's reputation, the campaign increased support for the company's environmental objectives (AST Consulting, 2024).

In conclusion, firms hoping to succeed in a changing market must strategically include AR and VR in their FMCG marketing campaigns. It is not simply a fad. FMCG companies may increase brand loyalty, develop closer relationships with customers, and maintain their innovative edge by utilizing these immersive technologies.

AR IN HEALTHCARE

The healthcare sector is changing dramatically. By 2025, the VR and AR market for the healthcare sector is expected to expand at a rate of 30.7% annually, predicts Markets and Markets (Jump Growth, n.d.). A plethora of contemporary issues are presented by the rate of technological advancement, the need for more individualized patient experiences, rising medical costs, and an expansion of outreach to remote areas (WIPRO, 2021).

To adapt to the changing nature of medical services and raise the standard of patient care, the healthcare sector is currently increasing the use of linked devices in conjunction with 3D AR annotations and machine learning (Patel, 2024).

Clinical studies may be costly, challenging, and time-consuming. Through more effective and efficient data collecting and analysis, augmented reality (AR) has the potential to enhance the procedure. For instance, AR can be used in real-time to gather feedback, monitor side effects, and track patient progress—all of which can expedite and improve the accuracy of clinical trials (B, 2023).

But these amazing advancements in healthcare are opening the door to new difficulties, such as: soaring expenses in the medical field, new technical innovations, individualized medical care for patients, greater effort is being made to provide healthcare in rural areas (Patel, 2024).

The combination of robotic-assisted surgery with augmented reality (AR) is greatly improving the accuracy and efficiency of complex medical procedures. AR helps surgeons make well-informed decisions and directs their motions during surgeries by superimposing vital information in real-time. This enhances surgical outcomes and patient safety (Patel, 2024).

Surgeons, for instance, can examine patient vitals while performing a treatment without taking their eyes off the screen by donning an augmented reality (AR) capable gadget. Surgeons will be less likely to misread or misinterpret the data and make mistakes as a result. Thus, businesses are paving the way for digitization and giving their patients the right value by implementing augmented reality in healthcare (Patel, 2024).

Augmented reality (AR) can significantly improve the drug delivery process by offering a

more precise and effective distribution mechanism. To guarantee that the right amount of medication is given to the right spot, medical practitioners can utilize augmented reality (AR) to obtain real-time advice and feedback during the delivery process. This can lessen mistakes and enhance patients, particularly for medications that call for exact dosage. It can be used to give insulin by giving real-time advice on the appropriate injection site and amount (B, 2023).

Augmented reality (AR) can be combined with AI to deliver diagnoses that are more accurate or with Internet of Things (IoT) devices to monitor patient health and provide real-time feedback. Doctors find that augmented reality aids in patient diagnosis and treatment. It can simplify difficult-to-understand medical pictures, such as those from MRIs and CT scans. This improves the accuracy with which doctors can diagnose illnesses. Moreover, AR aids in better treatment planning for physicians. It can illustrate how a medication might affect a patient's physiology, enabling doctors to adjust the medication or dosage as necessary (Gami, 2023).

Augmented reality in healthcare facilitates communication between medical professionals and patients by translating complicated medical information into simpler-to-understand pictures. Patients benefit from feeling more at ease and content with the care they are receiving (Gami, 2023).

With the use of augmented reality (AR) apps, patients can point to the parts of their bodies that hurt or are uncomfortable by superimposing 3D replicas of those parts on their own. This can assist medical professionals in precisely and swiftly diagnosing the patient's condition (Gami, 2023).

It's an intriguing idea to use augmented reality (AR) to provide doctors a better perspective of patients who live far away (Mesko, 2024). An augmented reality app, for instance, can help a patient pinpoint the precise area of chest pain. With this information, the doctor can focus on other potential causes of discomfort and rule out diseases like a heart attack (Gami, 2023).

Amrita Hospital in Kochi has created a first-of-its-kind Augmented Reality (AR) technology to improve patient care, medical education, and research. By facilitating precise surgical planning, personalized implants and prosthetics, the creation of cutting-edge medical devices, and improved medical education and training, the application of these technologies is poised to revolutionize medicine (Amma, 2023).

According to the World Health Organization (WHO), there is a global shortfall of 12.9 million doctors, nurses, and other healthcare professionals. It would be simpler to prepare medical professionals and offer greater insights into the subtleties of body processes with virtualized trainings and immersive, interactive learning experiences, such as a layer-by-layer study of human anatomy and body mechanics (WIPRO, 2021). AR thus has potential to solve shortage of healthcare professionals seen in times such as during the pandemic.

By employing a handheld scanner that projects over the skin and displays nurses and doctors where veins are in patients' bodies, the business uses augmented reality to help medical workers become more proficient blood drawers. It has been used on over 10 million patients, according to Luciano, increasing the likelihood of finding a vein on the first stick by 3.5 times. Healthcare workers could benefit from this technology and develop new abilities (Mesko,

2024).

Augmented reality is also expected to revolutionize the pharmaceutical sector offering major advantages to patients and medical professionals alike (B, 2023). The pharmaceutical sector is dealing with a number of issues, such as growing expenses, heightened competition, and the requirement for more patient involvement. AR can help the industry improve a number of elements of its operations while simultaneously helping to address these problems. AR-enabled medical equipment and AR-enabled medication distribution are only two of the numerous uses for AR. By providing medical professionals with new methods for training, practice, and decision-making, augmented reality (AR) can also be a significant factor in medical education (B, 2023).

In the pharmaceutical industry, where even small errors can have serious repercussions, quality control is crucial. AR has the potential to revolutionize this field by directly superimposing important digital data onto tangible goods. A quality control representative using AR glasses might quickly read batch numbers, production dates, and other critical information by just glancing at the product during an inspection. Furthermore, complex AR systems can be designed to automatically recognize and highlight possible flaws or inconsistent data, speeding up the quality assurance procedure and reducing human error (B, 2023).

SUSTAINABILITY AND ENVIRONMENTAL IMPACT

AR has the potential to increase public understanding of environmental issues by providing more compelling and impactful visualizations of data regarding pollution, climate change, and conservationactivities. Through immersive experiences at the point of sale, augmented reality (AR) can be used topromote environmentally friendly items by demonstrating to buyers the advantages of choosing sustainable goods.

Godrej Appliances' eco-friendly air conditioning campaign brought attention to the company's efforts to cool both consumers and the environment by utilizing cutting-edge, interactive technology to createa captivating experience. To convey the main notion of the brand, the advertisement cleverlyemployed augmented reality to ask viewers to locate green objects in their surroundings (Scroller, 2019).

Arbitral tribunals may start performing virtual site visits as confidence in the technology increases andthe advantages (including the reduction of carbon footprint) are more widely acknowledged. This willeliminate the need to travel to various locations, which can save time and money (Ammar, Shearman,Rees, & Clark, 2024).

While AR has proven effective in raising awareness for social issues, environmental and conservationefforts have not widely embraced this technology. AR could be utilized to educate the public about climate change and environmental degradation by creating interactive experiences that show the future impact of current actions. For example, users could visualize deforested areas or melting glaciers, helping to build a sense of urgency for environmental conservation.

APPLICATION OF AR IN INDIAN COMPANIES

Several big companies have adopted AR to provide different solutions. Design, sound, haptic, feedback(Chakraborty & Gupta, 2017). Brands like clothing, makeup, and eyeglasses have

also embraced augmented reality technology for product visualization. Online buyers can "try on" things electronically by uploading a selfie. These firms help take the guesswork out of online purchasing by enabling customers to see things on themselves or in their homes, which raises customer happiness and conversion rates (Ecommerce Result, n.d.).

Shoppers stop

The goal of any fashion fanatic is to try on dozens of items without having to take off their clothes or wait in long ques. We also want to try the maximum products and spend minimum time and efforts (Experenti, 2015).

Shoppers stop is one of the major premium retailers of clothing and cosmetics. It installed its first AR mirrors in Mumbai to use this innovative approach which allowed customers to options to select and view apparel on them (The Economic Times, 2015). The initiative addressed the issue of long queues outside the changing rooms and increased customer convenience by successfully reducing the shopping time in its store (Kazi, 2017). The customers were then able to try and layer products from maximum choices.

Lenskart

Eyewear is seen as both a necessity and a fashion statement (Goel, Garg, Sharma, & Rana, 2024). Customers want to look their best and keep up their eyewear according to the current fashiontrend. Lenskart is amongst the first eyewear brand that started using AR to boost its online presence and enhance the in its store experience for better engagement (INDIANtelevision, 2023).

Lenskart researched about the process that consumers go through while making offline purchase andbased on it three things became evident needed –

1- Customers want to evaluate the product directly on their face.

2- They want real-time product comparisons.

3- Users ask friends and family for inputs.

Based on this a roadmap was constructed which allowed customers to try frames on them,view it in 360 degrees and also compare and share multiple frames. The efforts resulted in online conversion witnessing a rise in double digits on average (Garg, 2021).

Anusri A and Malarvizhi E in the study found that the AR function in Lenskart has only garnered strong satisfaction from 35% of respondents; hence, the company ought to concentrate on enhancing user interactions with the app. The study also saw that people are still reluctant to buy anything from Lenskart because they do not feel the same way as they do when they browse in-store, even after utilizing the augmented reality feature.

There was a broad consensus among the respondents on the lack of a clear and accurate portrayal ofspectacles on Lenskart provided by AR. Shifting their viewpoint will enable Lenskart to long-term achievement (A & Ethiraj, 2024).

The brand saw positive response from its customers. At the same time, several customers

complained that the AR tool for suggesting the size is inaccurate (playstore review).

Tanishq

One example of how retail brands are incorporating digital solutions to adjust to shifting consumer behaviour is Tanishq's use of augmented reality technology. The top jewellery business in India launched augmented reality (AR) virtual try-ons for its merchandise, allowing customers to see how an item of jewellery might seem on them from the comfort of their own homes. This innovation improved consumer happiness and increased online sales by bridging the gap between online and in-store buying (Experro, 2024).

Gems and jewellery are valuable, and jewelers may not want to hand over every piece to customers. Then they can use AR to let customers see the jewellery and try it on them. This can also save jewellery thefts as not all jewellery will be kept outside for display.

Titan's jewellery Tanishq started using Augmented Reality to allow the customers virtually try-on their'Romance of Polki' collection (Vossle, n.d.). It puts up kiosks at Delhi and Bangalore airports along with providing in app technology to offer an immersive experience to its customers. The technology allowsthe display of a huge stock of jewelry that can otherwise be stocked in a large format showroom only.Moreover the real time experience of wearing a jewellery is expected to strengthen the relationship between Tanishq and its customers (exchange4media, 2019).

It was successful in meeting the needs of customers who could find the right fitting jewellery for themselves as the application had features of adjusting the jewellery with the head movement.

They could not only experience it themselves but also share their pictures friends and family. Thisconcept of trying before buying received a lot of attention and seems a definite way of building connection with the customers (INDIANtelevision, 2024).

Because augmented reality allows for creative virtual try-ons, the jewellery industry is being revolutionised. Adopting augmented reality technology, such as sophisticated jewellery photography,will help your company remain competitive in the market. It has a number of advantages, such as improved client experiences and lower return rates. This innovative augmented reality technology offers convenience and real-time personalization. It transforms jewellery browsing into something more dynamic and captivating. The jewellery business will find virtual try-ons indispensable as the jewellery experience of the future develops. Customers may try on jewellery with confidence and make wise judgments thanks to this (Experro, 2024).

TVS Motors

T.V. Sundaram Iyengar founded TVS Motor Company in 1911 is a well-known global manufacturer of two- and three-wheelers. TVS Motor firm is a pioneering firm. The first moped in Indiawith two seats. The first business in India to equip a 100cc motorcycle with a catalytic converter. Thefirst connected scooter, equipped with navigation and call support services. Being a firm of firsts necessitates creativity and unconventional thinking. TVS Motor thus believes in utilizing innovative technologies and the ideal solution to give their customers a rich, engaging experience and enable their sales teams to increase reality.

They envisioned an application that would allow customers to interact with the Apache motorcycles in-person by allowing them to watch movies explaining the technologies underlying the newest advancements, click on parts to learn details about essential features, and even change the colour options in real-time. Customers have more influence over the purchasing process because they can even change additional aspects, such colour options, right in the application.

TVS Motor realized that giving their sales teams access to the same augmented reality application would help them convey complex subject matter to consumers and help them create consistent brandstories.

In the end, the application made it possible to use training and sales efficiency to shorten sales cycles and enhance client experience. Every time a customer enters the dealership, their purchasing confidence is fuelled by engaging experience and an empowered sales team (PTC, n.d.).

"It's a delightful customer experience to be able to visualize a product in front of them and interactwith it,"

- Meghashyam Dighole

(Head of Premium Business Marketing and Associate Vice President)

Nerolac

AR has enormous potential benefits for the paint business. Prior to this technique, buyers had two options: either paint a little swatch of a colour to adhere to a wall, or to start painting and then decide they despised the color. Neither situation was perfect therefore, AR eliminates intervened to eliminate the guesswork. However, with the help of AR customers can now instantaneously visualize their entirehome in the new shade, which has completely changed the paint purchase experience (Quoc, 2018). This experience is made available by Nerolac. Kansai Nerolac Paints, a decorative paint manufacturersituated in Mumbai. Users can preview their homes in a specific Nerolac shade throughthe preview option. The Nerolac Color My Space app also includes tutorials that walk users throughusing it (News18, 2020). This innovation builds their tech-savvy brand image while also improving client engagement.

Renovations become easier, more efficient, and much more fun with the help of augmented reality home décor apps. With just a press of a hue, the Dulux Visualizer app can change the walls in your house. Before makinga purchase, buyers can use augmented reality (AR) to see how a specific tile or paint colour might lookin their home. This helps them make better educated judgments and steer clear of expensive blunders (Sharma, 2022).

FUTURE SCOPE OF AR

Although augmented reality (AR) technology has significantly advanced in many areas, there are still those that are not as advanced as others. To improve functionality, user engagement, and operational efficiency, this section examines the major industries that have not yet adopted augmented reality and investigates potential applications.

Insurance Sector

Though augmented reality (AR) technology has the potential to improve the number of operations, the insurance business has been slow to adopt it. Augmented reality (AR) has the potential to improve not only claims but also customer service, damage assessment, remote assistance, and consumer education (Agrawal, 2019).

Through interactive apps, clients could conduct self-inspections with AR equipment, saving time and money on manual claim processing (HDFC ERGO, 2021). For example, Insurance adjusters can digitally examine the damage to homes after accidents or natural disasters thanks to augmented reality (AR), which has the potential to significantly improve damage assessments.

Additionally, by visualizing policy coverage, augmented reality (AR) could improve consumer engagement by giving clients a more concrete knowledge of intricate insurance products. AR can also be used to train upcoming insurance agents. Unlike in-person training scenarios, anew agent in an insurance company can use augmented reality (AR) to play through a scenarioas many times as necessary to thoroughly comprehend an idea or process. As an illustration, an AR app might be used to train a new agent with different circumstances for everyoperational location of value chain for insurance (Rajaraman, 2018). In an analogous way, sales representatives can be trained via AR glass (a head-mounted device), with the trainer overseeing their progress from a distance. This will help in providing fun-filled training, with increased engagement and comprehension (Rajaraman, 2018).

Common people often are not well informed about insurance terms, things that can be insured, and how to get an insurance. As per IRDAI insurance penetration in India is just 4% whichis even lower than global average of 6.8% (Bhatnagar, 2024). The insurance companies can use AR and create awareness around the things that can be insured so consumers might investigate the insurable items further. Companies can make this an entertaining and engagingexperience which my help in making the clients develop a notion about insurance for their belongings—something they may not have considered otherwise.

The insurance industry's future offers even more customer-centric offerings, simpler processes, and a deeper understanding of risk. The insurance business will continue to be at the forefront of advancement because of the revolutionary potential of these technologiesas they develop and grow (KMG, 2023).

The use of AR in insurance will grow over the next several years, and insurance businesses will make extensive use of this novel experience. Traditional players must stay up to date and make sure that the "AR" disruption does not negatively impact them.

Legal

AR is still not widely used in the legal industry, despite the fact that the technology has the potential to transform procedures like understanding the incident and the presentation of evidence in court. AR can make it easier for juries and judges to comprehend complex evidence and the timeline in a more intuitive and engaging way. This can be done by delivering a real-time visualization of the scenario by superimposing digital data over the real-world using AR. Attorneys may use augmented reality (AR) to rebuild crime scenes so juries could see what happened in 3D and make better decisions. Furthermore, augmented reality (AR) could help in contract analysis by enabling attorneys and clients to examine papers with interactive

highlights and annotations for better clarity.

The Indian judiciary has been active in implementing modern technology as seen particularly afterCOVID-19 pandemic where virtual hearings have replaced in-person hearings in many courts and tribunals in recent year (Kohli, 2024). AR presents an opportunity to adopt new technologies in present times when as per Supreme Court Observer, the number of cases pending in the court are showing and increasing trend from 2020 (Kashyap, 2024).

Artificial reality also finds utility in cases involving medical examinations. It will allow depictionof medical issues, injuries, or procedures which can facilitate a more interesting and approachable understanding of complicated medical concerns for juries and judges (WardBlawg, 2023).

Particularly in courtrooms, these technologies have enormous potential for the legal industry by improving the way that evidence is presented. They have the power to completelytransform the way juries deliberate, how evidence is presented, and even how courts operate(Bron, 2023).

Outside of the courtroom, augmented reality (AR) is being utilized increasingly to bridge language gaps that may occur in any dispute, particularly in instances involving many jurisdictions. The tools available range from simple smartphone translation apps to more advanced AR gadgets that can interpret conversations in real time (Ammar, Shearman, Rees, & Clark, 2024).

In addition to easing logistical obstacles, AR will increase access to justice by removing the need for costly and time-consuming travel by providing virtual hearing, particularly for vulnerable parties or distant expert witnesses (UNESCO, 2023).

Courts must negotiate this digital revolution by striking a balance between welcoming innovation and safeguarding values of justice and fairness. Initiatives aimed at enhancing judges' capacity should also be given top priority as not all legal practitioners have the technical expertise (WardBlawg, 2023).

However, making sure that virtual or augmented evidence is authentic and dependable remains one of the main concerns. To overcome this the legal practitioners must set precise procedures and rules for the gathering, storing, and use of personal data in digital and extended reality simulations in order to allay these worries. This could entail getting clients' informed consent, making sure confidential data is stored safely and accessible to authorized staff,and limiting the use of these cutting-edge technologies to circumstances that truly call for them (WardBlawg, 2023).

Furthermore, to preserve sensitive material submitted in court, emphasis must be paid to cybersecurity, privacy, and data protection. For example, in a personal injury case, simulated reality may be used to recreate a client’s injuries and demonstrate the impact on their daily life. While this could be a powerful tool for building empathy and understanding, it could also be viewed as an invasion of privacy (WardBlawg, 2023). And because not every court or legal participant has the means or technological know-how touse VR and AR providing equal access and training are additional issues that needs to be resolved. (UNESCO, 2023). By taking care of these issues, the legal system can optimize AR's advantages.

Agriculture

The foundation of human survival and advancement since the beginning of civilization has been agriculture. Farming has seen continuous change over the ages, from crude implementsto the introduction of automation during the Industrial Revolution. Drones, autonomous tractors, and precision farming are just a few examples of technological advances that have revolutionized the agriculture industry recently (Adamska, 2023).

Despite the increasing significance of precision farming, the agricultural industry continues to be among the least integrated in terms of augmented reality technologies. Augmented Reality (AR) has the potential to help farmers visualize real-time data about crop health, weather, and soil quality. Farmers might obtain on-the-spot data analysis through AR glasses or smartphone applications, which would improve decision-making about irrigation, pest management, and planting dates. This would result in increased productivity and resource efficiency in Indian agriculture (Capsule Sight, 2023).

Augmented reality in agriculture has several, far-reaching advantages that could transform farming methods and increase sustainability. AR presents viable solutions as farmers around the world struggle with the effects of climate change. AR can help with the transition to greener agriculture systems by facilitating the creation of farming simulations that evaluate the efficacy of eco-friendly approaches. Moreover, AR's precise tools guarantee resource efficiency, advancing environmental objectives (Adamska, 2023).

AR will become increasingly important in determining the direction of agriculture as technology develops and use rises. Farmers, researchers, and consumers may collaborate to assist the development and uptake of these innovative solutions, guaranteeing a more sustainable and effective future for the agriculture sector, by investigating and interacting with augmented reality technology.

However, implementing AR is a challenge with high initial costs of AR technology, lack of investments for infrastructure and lack of knowledge amongst farmers hindering AR’s widespread adoption (Morrison, 2024). Moreover, the accuracy and effectiveness of AR tools are contingent on the quality of data fed into them. As industry grows, it will be imperativeto address these challenges to fully harness AR’s potential (Adamska, 2023).

Clothing

The term "second skin" is frequently used to describe clothing. In addition to influencing the wearer's physical appearance, it has also been linked to psychological health (Choudhury, 2024). Clothing has a significant influence on a wearer's self-esteem and is a type of nonverbal communication. Elderly people have significant desires for self-worth and self-respect, and their entire image is enhanced by their dress choices. Therefore, clothing is crucial because it encourages constructive social connection (Choudhury, 2024).

Along with chronic ailments, the human body undergoes numerous degenerative changes as we age. These factors cause the body to undergo general physical and physiological changes, causing trouble in moving and using their bodies to their full potential. This makes it challenging for them to fit into the clothing produced by the retail fashion business therefore, generating the demand for goods and services with unique designs. They need clothes that are adaptable, which means that theycan accessible, designed to meet their physical needs, and

without sacrificing flair (Choudhury, 2024).AR can help in overcoming these challenges and should try to address elder population issues.

This becomes much important in India; as the number of elderly people is growing. And as people getolder, their needs also shift. The retail market does not provide enough equipment to meet the needs of this segment. Developing ready-to-wear apparel with adjustable characteristics to improve the elderly's lives (Choudhury, 2024).

Online retailers of clothing have long faced the difficulty of dealing with return rates as high as 30% to40% (Blair, 2017) which could be because of the cloth not fitting or looking nice on customer's body. Zara introduced an in-store augmented experience where customers can watch models wearing a variety of clothes in clips lasting six to twelve seconds by holding their phones up to specified shop windows or sensors within the store and using the Zara AR app (Sandler, 2018). This allows the customer to examine how the item fits and moves while removing the hassle of fitting garments to their body (Randazza, 2014).

Conversely, Gap made an effort to solve the body fit problem in their online buying process by letting customers visualize how its clothing will fit before they place an order. In order to accomplish this, an augmented reality (AR) software was developed that lets users select from five distinct body types and enter their height and weight to obtain a rough image of themselves. It is also seen that consumers ask for validation from their friends and family before making purchases therefore customers may now with the help of AR view and share two completely distinct looks side by side in real-time with friends (Randazza, 2014).

The benefits of AR are not limited to big brands like Zara or Gap rather it has been observed that less well-known brands are more affected by AR adoption in terms of product sales. Customers are more inclined to buy from less well-known brands when they utilize augmented reality to try products (Chandukala, Reddy, & Tan, 2022).

This is because consumers typically only concentrate on a small number of important products and brands when they employ product testers to sample products. On the other hand, when customers used AR to try the 16 lipsticks that were highlighted, sample activity was more uniformly distributed. Because of the increased sample activity, less well-known businesses and items may gain more from augmented reality (Chandukala, Reddy, & Tan, 2022).

Customers are also shown to rely more on AR to lower the chance of making a potentially disappointing purchase when they are unfamiliar with a particular category. Therefore, AR has the potential to promote the usage of online channels and attract new customers for enterprises and stores (Choudhary, Sriram, & Routray, 2015).

AR use is thought to have a greater impact on purchasing of niche goods. These goods are commonly referred to as the "long tail" of product sales since they usually appeal to a more specific target market. Additionally, the impact of AR usage is higher for more costly products. These results imply that when buyers can test risky purchases with augmented reality, they feel more at ease making them. Therefore, AR might be able to assist companies in boosting demand for premium or niche goods to boost sales (Chandukala, Reddy, & Tan, 2022).

Though the advantages of virtual try-ons for fashion may seem obvious, precise fit and intricate

details,such as the way different fabrics drape, can be particularly challenging to portray well now.The shorter product shelf life and growing customer demand for realism have made it difficult for many clothing stores to create an affordable 3D asset pipeline for their product lines.

For this reason, a number of apparel companies have experimented with various workarounds or approximations, while others have opted to forego the more complex technological problems of virtual try-on, to provide enhanced experiences for their clients (Cook, Ohri, Kusumoto, Reynolds, &Schwertzel, 2020).

Even if online shopping is becoming increasingly popular, servers report that 70% of consumers return 70% of their entire garment order within two to three days of receiving their things. Many product returns appear to be mostly caused by problems with "inappropriate fitting". Although onlineshopping is easy, it does not give buyers the same opportunity to try products before they buy as a physical store would. Because of this, it might not be able to compete with the in-store experience, where clients can view their options in person and try on items to ensure a proper fit before making apurchase (Fashinza, n.d.).

CONCLUSION

AR is revolutionizing the shopping experience through greater product interaction, customisation, and engagement, augmented reality (AR) helps customers make informed purchasingdecisions. One of the best instances of how WEBAR in retail increases customer trust and engagementis Nike's virtual view (Fingent, n.d.).

By allowing customers to view items in various contexts and personalizing retailers' offerings, augmented reality (AR) has the potential to revolutionize the consumer experience. After a transaction, AR can be used outside of the company to increase customer satisfaction and foster loyalty (Newsroom Gartner, 2019). AR also offers remarkable potential in increasing productivity of business processes (Power, 2019).

Customers will feel more confident in their purchases as a result, and there will be fewer returns because of fit or size issues (Ecommerce Result, n.d.). Images and videos can be used by fragrance brands to convey the crisp springtime scent. However, to evoke the nostalgia of scent the customer should remember that how a particular fragrance is.

By offering interactive experiences, such as product visualisation, immersive product information andvirtual trial on AR can make online shopping more engaging. This experience will provide customers with the reassurance they need to make confident purchasing decisions. For consumers who feel uncomfortable making purchases online, augmented reality (AR) can help lower purchase anxiety (Chandukala, Reddy,& Tan, 2022).

Despite the fast adoption of technological developments by Indian customers, most of the market share is still held by the offline sector. In the Indian market, the opportunity to virtually try a product is still in its infancy. This contributes to the complexity of online marketing and purchasing and eventually lowers conversion rates (Thomas, Investigating interactive marketing technologies – adoption of augmented/virtual reality in the Indiancontext, 2021).

Even though a number of sectors have already included augmented reality technology, there are still a lot of gaps, particularly in sectors like public services, insurance, legal services, agriculture and home Décor (IKEA). These industries stand to earn better results in social and business contexts, more customer involvement, and greater operational efficiencies from implementing AR.

According to Deloitte's research, the majority of consumers nowadays still place a high priority on value, product, and convenience when making purchases, notwithstanding any potential rise in customer expectations (Cook, Ohri, Kusumoto, Reynolds, & Schwertzel, 2020). Hence, presenting opportunity for companies to develop solutions which far exceed the customer expectations.

“I personally believe that the best innovation happens when you’ve got constraints,”

-Levi Strauss CEO Chip Bergh (Rosenbaum, 2019).

Consumers don't want technology to "disrupt" their experiences in the dressing room. They desire an improvement in their time (Randazza, 2014). Thus, AR apps should be able to reduce the time and resources required while offering more intuitive and seamless experiences by utilizing the capabilitiesof generative AI (Zaifri, Khallouf, Kaghat, Azough, & Zidani, 2023).

However, from the consumers perspective long learning curves are common with new technologies. Clients must first be able to use AR apps efficiently. Some people may need clarification on the technology. This learning will be easier by making the user interface simpler. Providing clear instructions and support can enhance user adoption. The ability to try products will become morewidely available as more people get acquainted with augmented reality.

REFERENCES

1. A, A., & Ethiraj, M. (2024, July 7). Exploring the Impact of Augmented Reality on Consumer Behavior: A Case Study on Lenskart. Retrieved from https://ymerdigital.com/uploads/YMER2307B9.pdf
2. Adamska, I. (2023, September 8). Augmented reality in agriculture: the future of farming technology. Retrieved from https://nsflow.com/blog/augmented-reality-agriculture
3. Agrawal, N. (2019, November 18). Can Augmented Reality be a gamechanger for Insurance? Retrieved from https://www.mantralabsglobal.com/blog/can-augmented-reality-be-a-gamechanger-for-insurance/
4. Aircards. (2021, July 22). 7 Applications of AR in FMCG. Retrieved from https://www.aircards.co/blog/7-applications-of-ar-in-fmcg#:~:text=FMCG%20stands%20for%20fast%2Dmoving,to%20connect%20with%20potential%20customers.
5. Akhtar, N., Khan, N., Khan, M. M., Ashraf, S., Hashmi, M. S., Khan, M. M., & Hishan , S. S. (2021). Post- COVID 19 Tourism: Will Digital Tourism Replace Mass Tourism? Sustainability. doi:https://doi.org/10.3390/su13105352
6. Ammar, L. B., Shearman, J., Rees, H., & Clark, S. F. (2024, April 3). VR and AR – The “Virtual” Future of Arbitration? London. Retrieved from https://dailyjus.com/legal-tech/2024/04/vr-and-ar-the- virtual-future-of-arbitration
7. AST Consulting. (2024, January 18). Revolutionizing FMCG Marketing: Unveiling the Power of

AR and VR Experiences. Retrieved from https://astconsulting.in/blog/2024/01/18/ar-vr-experiences- fmcg-marketing/#:~:text=AR%20and%20VR%20create%20a,before%20making%20a%20purchase%20decision.

8. Bettencourt, J. (2023, November 16). How the hospitality industry is using AR, VR for the guest experience. Retrieved from https://www.hotelmanagement.net/tech/how-hospitality- industry-using-ar-vr-guest-experience
9. Bhatnagar, R. (2024, February 9). Insurance penetration in India is 4%, lower than global average of 6.8%. Retrieved from https://cafemutual.com/news/insurance/31376-insurance- penetration-in-india-is-4-lower-than-global-average-of-68#:~:text=IRDAI%20report%20reveals%20that%20the,6.8%25%2C%20shows%20the%20report.
10. Blair, A. (2017, February 14). Can Gap's Virtual Dressing Room App Reduce Returns? Retrieved from https://www.retailtouchpoints.com/features/trend-watch/can-gap-s-virtual-dressing-room-app-reduce-returns
11. Boboc, R. G., Băutu, E., Gîrbacia , F., Popovici, N., & Popovici, D. M. (2022). Augmented Reality in Cultural Heritage: An Overview of the Last Decade of Applications. Advanced Technologies in Digitizing Cultural Heritage. doi: https://doi.org/10.3390/app12199859
12. Boboc, R. G., Duguleană, M., Voinea, G.-D., Postelnicu, C.-C., Popovici, D.-M., & Carrozzino, M. (2019). Mobile Augmented Reality for Cultural Heritage: Following the Footsteps of Ovid among Different Locations in Europe. Sustainability. doi: https://doi.org/10.3390/su11041167
13. Boopathy, J. (2023, April 18). Indian brands working their way into augmented reality marketing. Retrieved from https://jeffreyboopathy.medium.com/indian-brands-working-their-way-into-augmented-reality-marketing-8848ebeba220
14. Bron, D. (2023, June 13). Augmented Reality (AR) and Virtual Reality (VR) in Courtrooms. Retrieved from https://www.linkedin.com/pulse/augmented-reality-ar-virtual-vr-courtrooms-solidity- law/
15. Business Insider. (2020, April 9). Augmented Reality is the next big thing for brands: Frooti, OnePlus, TATA and other brands are leading the way. India. Retrieved from
16. https://www.businessinsider.in/advertising/ad-tech/article/augmented-reality-is-the-next- big-thing-for-brands-frooti-oneplus-tata-and-other-brands-are-leading-the-way/articleshow/75046023.cms
17. Capsule Sight. (2023, March 28). 15 Examples of the Use of Augmented Reality (AR) in Agriculture. Retrieved from https://capsulesight.com/arglasses/15-examples-of-the-use-of-augmented- reality-ar-in-agriculture/#:~:text=2.-,AR%2DBased%20Crop%20Planning,%2C%20crop%20rotation%2C%20and%20productivity.
18. Chakraborty, S., & Gupta, D. (2017). A Study of the Factors Impacting the Adoption of Augmented Reality in Online Purchases in India. IEEE International Conference on Recent Trends in Electronics, Information, and Communication Technology, 1526-1529.
19. Chandukala, S. R., Reddy, S. K., & Tan, Y.-C. (2022, March 29). How Augmented Reality Can — and Can't — Help Your Brand. Harvard Business Review. Retrieved from https://hbr.org/2022/03/how-augmented-reality-can-and-cant-help-your-brand
20. Chang, Y.-S. (2021). Applying the ARCS Motivation Theory for the Assessment of AR Digital Media Design Learning Effectiveness. Sustainability. doi: https://doi.org/10.3390/su132112296
21. Choudhary, P., Sriram, M., & Routray, S. (2015). Augmented reality usage in business and socio-political scenario. International Journal of Indian Culture and Business Management, 123- 135.
22. Choudhury, S. (2024). Adaptive Clothing for the Elderly of India: Analysis of the Current Market Scenario. International Journal for Multidisciplinary Research, 2582-2160. Retrieved from https://pdfs.semanticscholar.org/4fec/0fe379ae837264935af16b8efe81cfab63f4.pdf

23. Circuit Stream. (2022, May 6). 12 Examples of Augmented Reality in Different Industries. Retrieved from https://www.circuitstream.com/blog/12-examples-of-augmented-reality-in-different- industries
24. Cook, A. V., Ohri, L., Kusumoto, L., Reynolds, C., & Schwertzel, E. (2020, January 10). Augmented shopping: The quiet revolution. Retrieved from https://www2.deloitte.com/us/en/insights/topics/emerging-technologies/augmented- shopping-3d-technology-retail.html/#endnote-12
25. Ecommerce Result. (n.d.). 6 AR and VR technologies applied in ecommerce. Retrieved from https://ecommerceresult.com/en/ar-and-vr-technologies-applied-in-e-commerce/#:~:text=Through%20AR%2C%20users%20can%20adjust,technology%20for%20personalized%20marketing%20campaigns.
26. ET Brand Equity. (2018, July 30). Parle's new AR campaign users a taste of #TheFrootiLife. Retrieved from Parle's Read more at: https://brandequity.economictimes.indiatimes.com/news/digital/parles-new-ar-campaign- users-a-taste-of-thefrootilife/65192132
27. exchange4media. (2019, February 13). AR is frequently seen as existing somewhere in the midst of the real and virtual world spectrum, and it has enhanced retail engagement by making it even more immersive, engaging, and personal. Retrieved from https://www.exchange4media.com/marketing-news/tanishq-brings-its-first-augmented- reality-experience-to-customers-94662.html
28. Exchange4Media. (2019, February 13). Tanshiq brings its first Augmented Reality experience to customers. Retrieved from https://www.exchange4media.com/marketing-news/tanishq- brings-its-first-augmented-reality-experience-to-customers-94662.html
29. Experenti. (2015, November 19). Shoppers Stop and the first augmented dressing room in Mumbai. Retrieved from https://www.experenti.eu/realta-aumentata/ar/shoppers-stop-and-the-first-augmented-dressing-room-in-mumbai/
30. Experro. (2024, June 14). Augmented Reality in Jewelry & its Future Impact on Sales. Retrieved from https://www.experro.com/blog/augmented-reality-jewelry/
31. Fashinza. (n.d.). Are Virtual Mirrors The Next New Thing In The Fashion Retailing? Retrieved from https://fashinza.com/brands-and-retail/technology/are-virtual-mirrors-the-next-new-thing-in-the-fashion-retailing/
32. Faull, J. (2019, July 2). Conversion rates triple when L'Oréal uses AR tech to showcase products. Retrieved from https://www.thedrum.com/news/2019/07/02/conversion-rates-triple-when- l-or-al-uses-ar-tech-showcase-products
33. Fingent. (n.d.). Augmented Reality in Retail: Use cases and business benefits. Retrieved from https://www.fingent.com/blog/augmented-reality-in-retail-reimagining-the-future-of- shopping/
34. Garg, A. (2021, April 21). Using Augmented reality to drive real business! Retrieved from https://blog.lenskart.com/using-augmented-reality-to-drive-real-business-edd3b0244503
35. Geospatial World. (n.d.). L'Oréal Boosts Cosmetics Sales with Location-Based AR and AI Technologies. Retrieved from https://www.geospatialworld.net/prime/case-study/location-and-business-intelligence/loreal-boosts-cosmetics-sales-with-location-based-ar-and-ai-technologies-2/#:~:text=Personalized%20beauty%20experience%20with%20AR%20and%20AI&text=Following%20the%20acquis
36. Goel, P., Garg, A., Sharma, A., & Rana, N. P. (2024). Impact of Sensory Perceptions on the Urge to Buy Impulsively. JOURNAL OF COMPUTER INFORMATION SYSTEMS, 469-485. Retrieved from https://www.tandfonline.com/doi/pdf/10.1080/08874417.2023.2224748
37. HDFC ERGO. (2021, July 21). HDFC ERGO Takes a Technological Leap with AI Based Motor Claims Processing. Retrieved from https://www.hdfcergo.com/blogs/car-insurance/hdfc-ergo-

takes- a-technological-leap-with-ai-based-motor-claims-processing
38. Höllerer, T. H., & Feiner, S. K. (2004). Mobile Augmented Reality. In H. A. Karimi, & A. Hammad, Telegeoinformatics Location-Based Computing Services (pp. 221-260). Taylor and Francis Books Limited.
39. HT Tech. (2023, July 7). Lenskart joins Amazon to bring AR-based eyeware shopping online with Virtual Try-On feature. Retrieved fromhttps://tech.hindustantimes.com/tech/news/lenskart-joins-amazon-to-bring-ar-based-eyewear-shopping-online-with-virtual-try-on-feature-71688752106629.html
40. ICICI Lombard. (n.d.). ICICI Lombard launches Mobile Self Inspection for lapsed motor policy renewal. Retrieved from https://www.icicilombard.com/mobile-self-inspection
41. Kashyap, G. (2024, February 3). 80,221 cases pending in the Supreme Court in January 2024. Retrieved from https://www.scobserver.in/journal/80221-cases-pending-in-the-supreme- court-in-january-2024/#:~:text=At%20the%20end%20of%202023,saddled%20with%2080%2C439%20pending%20cases.
42. Kazi, Z. S. (2017, March 24). A closer look at Shoppers Stop's reality-based dressing room. Retrieved from https://www.indiaretailing.com/2017/03/24/a-closer-look-at-shoppers-stops-reality- based-dressing-room/
43. KMG . (2023, October 25). How AR and VR are Changing the Insurance Industry. Retrieved from https://kmgus.com/blog/how-ar-and-vr-are-changing-the-insurance-industry/
44. Kohli, T. (2024, January 22). Supreme Court takes stock of virtual hearing systems in High Courts. Retrieved from https://www.scobserver.in/journal/supreme-court-takes-stock-of-virtual- hearing-systems-in-high-courts/#:~:text=the%20High%20Courts.,Hybrid%20hearings,appearing%20physically%20in%20the%20Court.
45. L'Oréal Group. (n.d.). Style My Hair: Putting Artificial Intelligence To Work For Consumers. Retrieved from https://www.loreal.com/en/news/research-innovation/style-my-hair-putting-artificial-intelligence-to-work-for-consumers/#:~:text=First%20released%20in%202015%2C%20the,for%20hair%20stylists%20and%20consumers.
46. Lim, W. M., Jasim, K. M., & Das , M. (2024). Augmented and virtual reality in hotels: Impact on tourist satisfaction and intention to stay and return. Internatioanl Journal of Hospitality and
47. Management. doi:https://doi.org/10.1016/j.ijhm.2023.103631
48. Manjavidze, A. (2022, September 6). Popular use cases of Augmented Reality in the Hospitality industry. Retrieved from https://www.linkedin.com/pulse/popular-use-cases-augmented- reality-hospitality-ani-manjavidze/mCanvas. (2019, September 5). mCanvas Storytelling Ads | Men In Black: International | Scroller.India. Retrieved from https://www.youtube.com/watch?v=qGuZLmr6cYY
49. mCanvas. (2020, February 7). mCanvas Storytelling Ads | TATA Nx Zero Sugar | Scroller + Augmented Reality. Retrieved from https://www.youtube.com/watch?v=V7syPxCQsCc
50. Merchán, M. J., Merchán, P., & Pérez, E. (2021). Good Practices in the Use of Augmented Reality for the Dissemination of Architectural Heritage of Rural Areas. Applied Sciences. doi:https://doi.org/10.3390/app11052055
51. Miller, N. J. (2024, July 23). 8 FMCG Trends in 2024: Cases from TOP Companies. Retrieved from https://goodschecker.com/blog/5-trends-shaping-fmcg-industry-in-2023/
52. Morrison, O. (2024, April 22). Augmented reality in agriculture: how significant will it prove? Retrieved from https://www.agtechnavigator.com/Article/2024/04/22/augmented-reality-in-agriculture-how-significant-will-it-prove
53. News18. (2020, November 18). Nerolac Paints Has a New AR App That Shows Which Colours Would Suit Your Home. Retrieved from https://www.news18.com/news/tech/nerolac-paints-has-

a- new-ar-app-that-shows-which-colours-would-suit-your-home-3093938.html
54. Newsroom Gartner. (2019, April 1). Gartner Says 100 Million Consumers Will Shop in Augmented Reality Online and In-Store by 2020. Retrieved from https://www.gartner.com/en/newsroom/press-releases/2019-04-01-gartner-says-100- million-consumers-will-shop-in-augme
55. Okanovic, V., Ivkovic-Kihic , I., Boskovic, D., Mijatovic, B., Prazina, I., Skaljo , E., & Rizvic , S. (2022). Interaction in eXtended Reality Applications for Cultural Heritage. Applied Sciences. doi:https://doi.org/10.3390/app12031241
56. Power, D. (2019, April 10). Augmented Reality: A Realistic 'Try-Before-You-Buy' Visual Experience Drives the Evolution of Brands Like Wayfair. Retrieved from https://www.uschamber.com/co/good-company/launch-pad/augmented-reality- transforming-wayfair
57. Proven Reality. (2024, May 6). Hotel Augmented Reality: Elevating Guest Experiences. Retrieved from https://provenreality.com/hotel-augmented-reality/
58. PTC. (n.d.). TVS Creates Innovative Customer Buying Experience and Improves Sales Efficiency with AR. Retrieved from https://www.ptc.com/en/case-studies/tvs-uses-augmented-reality-for-product-visualization
59. Quoc, M. (2018, April 4). 10 retailers leading the way in AR. Retrieved from https://www.retaildive.com/news/10-retailers-leading-the-way-in-ar/520520/
60. Rajaraman, A. (2018). Creating Immersive Experience in Insurance through Augmented Reality.
61. LTIMindtree. Retrieved from https://www.ltimindtree.com/wp-content/uploads/2018/07/Augmented-Reality_web.pdf?pdf=download
62. Randazza, J. (2014, April 2). When Will AR Replace the Fitting Room?
63. Renascence. (2024, September 4). How L'Oréal Revolutionizes Customer Experience (CX) with Beauty Tech Innovations. Retrieved from https://www.renascence.io/journal/how-loreal-revolutionizes-customer-experience-cx-with-beauty-tech-innovations#:~:text=Increasing%20Conversion%20Rates%20Through%20AR,tool's%20impact%20on%20buying%20decisions.
64. Rock Paper Reality. (2023, October 18). Augmented Reality in Tourism and Travel. Retrieved from https://rockpaperreality.com/insights/ar-use-cases/augmented-reality-in-tourism-and-travel/#how-can-ar-enhance-travel-experiences
65. Rosenbaum, E. (2019, November 25). Levi Strauss CEO: 'Sizes will go out the window 10 years from now'. Retrieved from https://www.cnbc.com/2019/11/20/levi-strauss-ceo-sizes-will-go-out-the-window-10-years-from-now.html
66. Rösger, J. (2021, February 23). How L'Oréal uses augmented reality for an excellent customer experience. Retrieved from https://www.cdxe.de/en/blog/case-loreal-augmented-reality#conclusion=
67. Sandler, E. (2018, April 16). Zara Stores Target Millennials With Augmented Reality Displays. Retrieved from https://www.forbes.com/sites/emmasandler/2018/04/16/zara-stores- targets-millennials-with-augmented-reality-displays/
68. Sanina, A. (2011, August 19). Cadbury Transforms Its Chocolate Bars Packaging into an Augmented Reality Game. Retrieved from https://popsop.com/cadbury-transforms-its-choclate-bars- packaging-into-an-augmented-reality-game/Scroller. (2019, September 6). mCanvas Storytelling Ads | Godrej Appliances Eco-Friendly AC| Scroller + Augmented Reality. Retrieved from https://www.youtube.com/watch?v=ePXGqT5QmHI
69. Sharma, G. (2022, April 28). Usage of Augmented Reality in tiles & paint. Retrieved from https://www.augmentworks.com/blog/usage-of-augmented-reality-in-tiles-paint/#0
70. Smith, A. N., & Scholz, J. (2016, March-April). Augmented reality: Designing immersive experiences that maximize consumer engagement. Business Horizons, 125-244.

71. Statista Market Insights. (2024, April). Retrieved from https://www.statista.com/outlook/amo/ar-vr/india
72. The Economic Times. (2015, November 15). Shoppers Stop launches reality-based dressing room in Mumbai. Retrieved from https://retail.economictimes.indiatimes.com/news/apparel-fashion/apparel/shoppers-stop-launches-reality-based-dressing-room-in-mumbai/49788255#:~:text=Shoppers%20Stop%20has%20launched%20an,try%20on'%20the%20desired%20products.
73. Thomas, L. (2019, May 9). Nike thinks you're probably wearing the wrong size shoe. Here's what it's doing to fix that.
74. Thomas, S. (2021). Investigating interactive marketing technologies –adoption of augmented/virtual reality in the Indian context. International Journal of Business Competition and Growth.
75. Thomas, S. (2021). Investigating interactive marketing technologies –adoption of augmented/virtual reality in the Indiancontext. International Journal of Business Competition and Growth, 214- 230. Retrieved from https://www.inderscienceonline.com/doi/epdf/10.1504/IJBCG.2021.116266
76. Times of India. (2022, October 12). India will pip US to become world's second-largest online shopper base. Retrieved from https://timesofindia.indiatimes.com/business/india-business/india-will- pip-us-to-become-worlds-second-largest-online-shopper-base/articleshow/94801621.cms
77. Truyols, M. (2023, June 13). 5 Ways Augmented Reality is Enhancing the Tourism Experience. Retrieved from https://mize.tech/blog/5-ways-augmented-reality-is-enhancing-the-tourism-experience/
78. UNESCO. (2023, July 21). Exploring the Impact of Virtual and Augmented Reality in Courts. Retrieved from https://www.unesco.org/en/articles/exploring-impact-virtual-and-augmented-reality- courts
79. Unified AR. (n.d.). Augmented Reality: What It Is in Terms of the Senses. Retrieved from https://www.unifiedar.com/blog-articles/augmented-reality-senses/#:~:text=Retailers%20can%20create%20a%20sense,surface%20of%20the%20polished%20wood.
80. Vossle. (n.d.). Tanishq uses Vossle to enable World's First Try-On in Metaverse World's First Try-On in Metaverse. Retrieved from https://vossle.ai/our-work/tanishq-try-on/
81. WardBlawg. (2023, April 22). Virtual and Augmented Reality in Courtroom Litigation: The Future of Evidence Presentation. Retrieved from https://wardblawg.com/2023/04/22/vr-ar-courtroom-litigation-future-evidence/
82. Wei, W. (2019). Augmented and virtual reality in hotels: Impact on tourist satisfaction and intention to stay and return. Journal of Hospitality and Tourism Technology, 539-570.
83. Zaifri, M., Khallouf, H., Kaghat, F. Z., Azough, A., & Zidani, K. A. (2023). From Earlier Exploration to Advanced Applications: Bibliometric and Systematic Review of Augmented Reality in the Tourism Industry (2002–2022). Multimodal Technologies and Interaction. doi:https://doi.org/10.3390/mti7070064