Research Article

The Impact of Consumer Perception Towards Virtual Reality (Try-on) Features in Online Clothing Platforms – A Detailed Review Between E-Commerce and V-Commerce

Ekta Jain[1] and Dr. Preeti Chhabra[2]
[1]Research Scholar, School of Commerce, MRIIRS.
[2]Associate Professor, School of Commerce, MRIIRS.

*****Corresponding author: Ekta Jain (*ekta.jain06@gmail.com*)**

Abstract: In the rapidly evolving landscape of online Retail, integrating Virtual Reality and Augmented Reality technologies has transformed the shift from traditional e-commerce to immersive v-commerce, particularly gaining speed in the COVID-19 pandemic. The study evaluates consumer awareness of VR try-on features, assesses shopping experiences, and identifies perceived benefits and challenges. .it also indicates that Augmented Reality (AR) and Virtual Reality (VR) significantly enhance user engagement and satisfaction by allowing consumers to visualize clothes in a real-time manner, which helps to reduce return rates and increase purchase confidence. This study provides insights for retailers on leveraging immersive technologies to enhance customer experiences and increase sales, which shows the importance of understanding consumer perceptions in the evolving digital marketplace.

Keywords: Consumer Perception, E-commerce, Online Clothing platforms, Virtual reality, Virtual Try-On, V-Commerce.

INTRODUCTION

In Today's Digital World, the internet plays an influential role in our daily lives, significantly impacting the clothing industry. The way consumers shop for clothes online has completely transformed, with many growing trends on various e-commerce platforms to meet their fashion needs and trends. During the pandemic, e-commerce experienced explosive growth in India. Many individuals have their preferred online clothing stores, and e-commerce continues to evolve and enhance with many advancements, such as mobile shopping, social commerce, and omnichannel retail strategies. Technologies like Augmented Reality (AR) and AI-driven product recommendations are enhancing online shopping experiences and making them more engaging and interactive. In this Digital world, online shopping has become more than just a convenience; it serves as a vital fashion trend to showcase one's style and remain engaged with the dynamic nature of fashion. Augmented Reality (AR) significantly allows consumers to visualize how garments will look and fit on them before purchasing the product. This technology effectively bridges the gap between traditional physical store shopping and online shopping experiences, offering consumers more interactive and immersive online clothing shopping experiences.

VIRTUAL REALITY TRY-ON FEATURES IN E-COMMERCE AND V-COMMERCE

E-commerce describes the buying and selling of products and services all over the Internet. It embraces a wide range of online business activities. Virtual Reality (VR) try-on features are revolutionizing the online clothing shopping experiences by allowing consumers to visualize how products will look on them before making a purchase. Virtual try-on features showcase advanced technologies like 3D Modeling, Augmented Reality (AR), and motion tracking, which create a virtual environment where users can realistically interact with the product. Consumers can also use VR headsets or AR applications on their smartphones to see how the products would look on them. A user can virtually try on a dress, adjusting the size and fit before making a purchase, which shows a product from multiple angles and helps to make decision -making. In VR try-on solutions, this technology allows customization, which enables users to select colors, sizes, and styles that suit their preferences. The system can utilize data from users, such as body measurements or uploaded photos, to create a personalized virtual fitting model which helps provide a more accurate representation of how a product will look and fit, which can significantly decrease return rates and make shopping easier. The immersive shopping experience provided by Virtual Reality can enhance emotional connections with the products, which potentially leads to higher purchase intentions.

In a Nutshell, both V-Commerce and E-Commerce are maximizing the potential outcomes in Virtual Reality Try-on features to enhance the online clothing shopping experience. V-Commerce offers a fully immersive environment that allows for greater interactivity and personalization, while E-Commerce integrates VR and AR technologies to improve product visualization and reduce uncertainty. As technology continues to evolve, the integration of Virtual reality Try-on features is expected to grow and transform consumers to shop online and interact

with the product in a realistic way.

LITERATURE REVIEW

(Dr. P. Archana et.al,2024) The paper semantically examines existing research on Augmented Reality applications in online clothing shopping, which focuses on Virtual Try-on (VTO) and 3D visualizations. It also highlights that AR significantly enhances consumer engagement and satisfaction by providing immersive and interactive online shopping experiences, which can lead to reduced return rates and increased confidence in decision-making. (Sahnoza Kayadibi,2024) This Study focuses on consumer skepticism, engagement, and the effectiveness of immersive technologies in marketing. It highlights the benefits and challenges associated with Augmented and Virtual Reality applications in retail, which emphasize the need for transparency and consumer trust. It also explores the relationships between variables such as privacy concerns, complexity of use, and application knowledge. (Generoso Branca et.al,2024) This study highlights the consumer's evaluation of VR technology by analyzing existing research and identifying the knowledge gaps. This study reveals four main themes related to consumer behavior in VR, highlighting the unique characteristics of product evaluation in an immersive environment, and the implications for making strategies. (Abiodun Oyelami,2023) This study provides a comprehensive examination of Augmented Reality in fashion retailing, which focuses on its impact on consumer engagement and purchase intention This approach allowed for a deeper understanding of the AR features such as Virtual try-ons, enhance user experience and influence purchasing behavior. Ultimately, it reveals significant insights into the transformative potential in the fashion retail sector. (Marina Ricci et.al, 2023) This study examines the existing research on the application of virtual reality in enhancing online shopping experiences. It also reveals that VR significantly enhances user experience by providing more engaging and interactive platforms as compared to traditional online shopping methods. It suggests that VR technologies can transform e-commerce by addressing challenges such as product visualization and customer satisfaction. (Mirela-catrinel Voicu et.al,2023) This study focuses on Augmented Reality and Virtual Reality and their impact on consumer behavior and satisfaction. The findings from various empirical studies help to identify key themes such as the effectiveness of virtual try-on features, user engagement, and the psychological factors influencing technology adoption. (Virginie Lavoye et.al,2023) This study highlights the concept of virtual try-on (VTO) technology within the augmented reality (AR) framework, which emphasizes its significance in enhancing consumer-brand interactions and self-exploration. Data analysis utilized structured equation modeling (SEM) to assess the relationship among these variables, which confirms that self-presence significantly enhances self-explorative engagement, which subsequently improves brand attitudes through increased cognitive processing. (Bastian Quattelbaum et.al,2022) This study introduces the exploration of Virtual Reality and Augmented Reality technologies in the clothing purchasing decision-making process. The analysis focuses on identifying the impact of AR and VR applications on purchasing decisions, while also addressing the challenges which affect consumer acceptance and the overall effectiveness of these technologies in the retail environment. (Galvao Meirinhos et.al,2022) This study explores the integration of VR technology in E-commerce, which highlights its potential to enhance consumer engagement through product contextualization and the influence of gender on purchasing behavior. The methodology involved an experimental design where participants interacted with a double-door refrigerator in two different contexts: a contextualized setting and a neutral empty room. The analysis indicated that neither contextualization nor gender significantly affected purchase intention or user satisfaction; however, a positive correlation was identified between presence and user satisfaction. (Prajakta Joglekar et.al ,2022) This study includes various techniques that help to develop virtual try-on systems and highlights the methods, such as image segmentation, image warping, and AR approaches, including both marker-based and markerless techniques. The comparative evaluation underscores the significance of selecting appropriate methodologies to enhance users' experiences in virtual clothing trials, which enhance the fashion retail landscapes. (Kamran Mustafa Abbasi,2022) This study provides comprehensive research on Augmented Reality (AR) and its impact on online shopping experiences, particularly in developing countries. It identifies key attributes of AR such as interactivity, enjoyment, and variety, which influence consumer behavior and purchase intentions. They compare AR-enhanced shopping experiences with traditional web-based shopping, which aims to uncover the unique advantages of AR in enhancing user experiences and driving purchase intentions and their contribution in the field of e-commerce. (Dr. Anand Byram,2021) This Research study examines the evolving landscapes of Virtual Reality (VR) in e-commerce, focusing on its impact on customer perception and shopping behavior. It identifies key factors that influence the adoption of Virtual Reality (VR) in retail, ultimately providing insights into how these technologies can reshape the future of online shopping experiences. It reveals that these technologies significantly enhance shopping experiences by providing real-time visualization and reducing return rates. (Yuzhao Liu et. al,2020) This study explores Augmented Reality and Virtual Reality technologies in enhancing online shopping experiences. It shows the effectiveness of personalized avatars and the comparative advantages of AR and VR, realistically providing apparel visualization. This aims to establish a foundation for understanding how these immersive technologies can transform e-commerce and improve consumer engagement. (Hyunwoo Hwangbo et. al,2020) This study highlights the concept of Virtual Try-On (VTO) technology evolution and significance in the retail landscape, which addresses consumer challenges related to fit and size in online shopping. This study involves qualitative interviews with users of a 3D virtual try-on service to gather their experiences. It also provides a comprehensive understanding of how VTO enhances customer experiences and influences sales outcomes in the E-commerce platforms. (Sasadara B.Adikari, et.al,2020) This study highlights the various approaches such as

image-based rendering and integration of Kinect sensors, to address the limitations of traditional fitting methods. It also analyzes the effectiveness of AR and VR technologies in capturing body measurements and facilitating virtual try-ons, which emphasize the advancements made in real-time processing and user interaction. (Marlene Zak,2020) This study highlights the technological advancement, consumer adoption challenges, and the potential benefits of AR try-on features. They identify critical success factors and barriers to AR integration, which helps to contribute deeper understanding of the AR feature and enhance online shopping experiences. (Kaylyn Wenzel et. al,2020) This study introduces the growing significance of Augmented and Virtual Reality in enhancing consumer engagement and promoting social responsibility within the clothing industry.This study utilized regression techniques to explore the relationship between social responsibility concerns, knowledge of fair trade, and the moderating effects of AR and VR on purchase intentions, which reveals meaningful information on these technologies that influence ethical consumer behavior.(Meng Niu,2020)The paper highlights virtual reality applications in the clothing industry, which mainly focus on developing virtual fitting systems and their effectiveness in enhancing consumer engagement. It also reveals that while significant advancements have been made in virtual fitting technologies, challenges remain in achieving accurate body representation and user immersion. (Sasadara B. Adikari et.al,2020) This Research is related to virtual dressing rooms, which focuses on the use of webcams, camera arrays, and depth sensors for real-time clothing simulations.it highlights the various approaches such as image-based rendering ad the integration of Kinect sensors .it also anlayze the effectiveness of these technologies in capturing body measurements and facilitating virtual try-ons, emphasizing the advancement made in real-time processing and user interaction. (Chamodi jayamini et.al ,2017) This paper examines the role of Augmented Reality, focusing on its applications in fashion design, apparel self-customization, and enhancing consumer shopping experiences. This study reveals that AR not only enhances designers' creativity and skills but also empowers consumers to personalize their online shopping experiences, which ultimately transforms traditional retailing into more interactive and engaging formats. (Ekaterina Olshannikova et. al,2015) This paper focuses on integrating Augmented Reality and Virtual Reality technologies. This study includes a systematic approach that includes an analysis of various visualization techniques, tools, and their applications across different fields. This analysis not only highlights the advancements in visualization but also underscores the potential of AR and VR to enhance user interaction and understanding of Big Data and find ways for innovative solutions in data visualization practices.

(A.A. Shaikh et al.,2014) This study highlights the transformative impact of Augmented Reality (AR) and Virtual Reality (VR) technologies on online shopping experiences. It synthesizes various studies to explore the effectiveness of virtual try-on features, emphasizing their ability to enhance consumer engagement, reduce return

rates, and provide personalized shopping experiences. It also reveals that these technologies significantly improve the shopping experiences, but challenges such as technological accessibility and user adaptation remain critical considerations for successful implementation in e-commerce. (Jason A. Gabisch et. al,2011) This Research examines the landscape of virtual brand experiences and their impact on consumer behavior. They used an online survey that targets users of the virtual world Second Life, where participants provided insights on their experiences with real-life brands in a virtual setting. It also focused on key variables such as perceived diagnostic, self-image congruence, and behavioral consistency. Revealing how these factors influence consumer attitudes and decision-making processes across multiple channels and highlighting the significance of immersive virtual experiences in modern marketing strategies. (Reina Yahya Arakji, et.al,2008) This paper highlights the evolution of AR and VR technologies and their economic implications. They establish a theoretical framework for Avatar Business Value Analysis, which serves as a decision-making tool for businesses seeking to navigate the problems of virtual environments and optimize their value creation strategies.

Research Objectives	No of Reviews Mapped
1. To assess the level of consumer awareness and understanding of virtual reality (VR) try-on features in online clothing platforms.	8
2. To assess the overall shopping experience and satisfaction levels of consumers using VR try-on features versus those using standard e-commerce platforms	5
3. To identify the perceived benefits and drawbacks associated with the use of VR try-on features in online clothing shopping.	7
4. To explore the psychological factors influencing consumer behavior and technological adoption in online shopping experiences.	8
Total Literature Reviews Referred	28

COMPARATIVE ANALYSIS: E-COMMERCE AND V-COMMERCE

Criteria	E-Commerce	V-Commerce
Definition	Buying and selling goods or services over the internet via	Incorporates VR and AR technologies for immersive online

	websites and applications.	shopping experiences.
User Experience	Based on static Images, descriptions, and reviews, limited interactivity with the consumers.	Offers virtual try-ons and interactive activities help to enhance consumer engagement and satisfaction.
Technology Utilization	Utilizes standard web technologies (HTML, CSS, JavaScript)	Utilizes advanced technologies (VR headsets, AR devices) for realistic simulations
Consumer Interaction	Asynchronous interaction, limited real-time engagement	Interactive and social shopping experience in 3D environments
Return Rates	Higher return rates due to the inability to physically assess products.	Lower return rates as consumers can visualize products in a real-time manner.
Marketing Strategies	Traditional digital marketing techniques (SEO, email marketing)	Innovative marketing techniques through immersive experiences, higher emotional engagement
Challenges	High return rates, lack of personalization, and tactile experiences	Requires advanced technology and may have a higher initial cost.

THEORETICAL FRAMEWORK

The paper review integrates several established models and theories to analyze the impact of Augmented Reality and Virtual Reality on consumer behavior, particularly in online clothing shopping.

Innovation Diffusion Theory (IDT): This Theory is used to understand the factors that influence the adoption of AR technologies in fashion retail. Constructs such as relative advantage, complexity, trialability, and compatibility are examined to assess their impact on consumer attitudes and purchase intentions regarding AR applications.

Flow Theory: This Theory explores the experiential aspects of using AR applications, emphasizing user engagement and immersive experiences. It also suggests the consumer experience is a state of flow while using AR features, they develop positive attitudes and increase their purchase intentions.

S-O-R Framework (Stimulus-Organism-Responses): This model helps to understand how external stimuli such as AR and VR technologies influence internal consumers' intentions and behavioral responses.

Technology Acceptance Model (TAM): This model suggests that how perceived ease of use and perceived usefulness of AR and VR technologies influence consumer acceptance and adoption, which provides insights into the factors driving the adoption of technologies that embrace online shopping experiences.

Theory of Reasoned Action (TRA): This theory examines the relationship between attitudes, subjective norms, and behavioral intentions. It highlights that consumer attitudes towards AR and VR technologies affect their intention to use these technologies in shopping.

AIDA Model (Attention, Interest, Desire, Action): This model analyzes how AR and VR technologies can attract consumer attention, generate interest, create a desire for products, and ultimately lead to purchase actions, emphasizing the role of immersive experiences in marketing effectiveness.

Experiential Marketing: This concept focuses on creating memorable and engaging experiences for users, which leads to enhancing the use of Virtual Reality technologies in the Retail industry.

Telepresence: The feeling of being present in a virtual environment is crucial to understanding how VR and AR technologies impact consumer behavior. The higher levels of telepresence lead to a stronger emotional connection with products.

CHALLENGES AND OPPORTUNITIES

The integration of Augmented Reality and Virtual Reality in the apparel industry presents both challenges and opportunities.

Challenges

Technological Barriers: Implementation of AR and VR technologies requires significant investments in hardware as well as in software, which can be a barrier for small business Retailers. Not all consumers have access to the required devices, such as VR headsets or smartphones capable of AR applications can create a digital divide.

Consumer Acceptance: Some consumers may be not familiar with AR and VR technologies and shopping experiences, which leads to hesitation in adoption. Retailers need to invest in educating users to enhance acceptance.

Content Creation: Creating high-quality AR and VR content that accurately represents the products can be resource-intensive. Retailers must ensure that virtual representations are engaging and realistic to avoid consumer disappointment.

Data Privacy Concerns: The use of AR and VR often

involves collecting personal information and user data for personalized experiences, which raises concerns about data privacy and security. It needs to address this issue by the Retailers to build trust with consumers.

Opportunities
Enhanced Shopping Experience: AR and VR can significantly enhance the shopping experience, which allows consumers to visualize products in a realistic manner that helps to engage consumers and leads to higher sales and satisfaction.

Market Differentiation: Organizations that adopt AR and VR technologies can differentiate themselves in a competitive market by offering unique and engaging experiences, attracting and retaining customers more effectively.

Improved Customer Engagement: AR and VR technologies offer the potential for immersive and engaging user experiences, which involve understanding and retention of consumers. It also helps to make a loyal user for their brands.

Future Research and Development: The main challenges associated with AR and VR technologies present opportunities for future research and development, leading to advancements in technology that enhance overall effectiveness.

Reduced Return Rates: With the help of AR and VR, consumers are able to virtually try on clothes and visualize products in real-time, which can lead to higher satisfaction and reduced return rates.

RESEARCH GAP
The impact of augmented reality and virtual reality on consumer perception includes a limited understanding of consumer behavior and the decision-making process influenced by the technologies. There is also a challenge in consumer acceptance, as many are not familiar with AR and VR technologies, which creates technological barriers. These technologies have high implementation costs for small business Retailers, and data privacy concern is also a big concern that affects consumer trust, which remains unexplored. Additionally, empirical studies quantifying the impact of AR and VR on return rates are limited, and longitudinal studies are needed to track the evolving consumers' perception over time, particularly across different cultural contexts.

CONCLUSION
They significantly enhance consumer engagement and satisfaction in online shopping, particularly in the clothing sector. These technologies provide immersive experiences that boost confidence in purchasing decisions and reduce return rates. However, challenges such as technological accessibility, consumer skepticism, and data privacy concerns must be addressed for successful implementations. Overall, AR and VR are transformative forces in E-commerce, reshaping traditional retail into more attractive and personalized experiences, ultimately leading to improved consumer perceptions and loyalty in the digital marketplace.

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