The Role of AR and VR in Shaping E-Commerce: A Literature Review

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ABSTRACT

Purpose: Augmented Reality (AR) and Virtual Reality (VR) has a potential to transform the e-commerce sector by offering immersive, interactive, and tailored buying experiences. This study attempts to investigate the current literature to explore the influence of AR and VR technologies on customer engagement and behaviour in e-commerce, as well as the prospective developments of AR and VR in transforming the e-commerce sector. The paper examines many academic and industrial sources that highlight the increasing significance of AR and VR in e-commerce, its primary uses, the obstacles they encounter, and their prospects for further advancement.

Design / Methodology / Approach: A literature review of academic articles, industry reports, and case studies published in the last 7 years was conducted to assess the role of AR and VR in e-commerce. The sources were retrieved from academic databases such as Google Scholar, Scopus, IEEE Xplore, and industry reports. The keywords used for search include terms such as "AR and VR in E-Commerce," "AR in e-commerce," "VR shopping experience," "virtual retail," "E-Commerce and VR," and "immersive technologies used in online shopping."

Findings: The study reveals significant conclusions about upcoming technologies like AR and VR in relation to e-commerce. The analysis concludes that augmented reality (AR) and virtual reality (VR) enhance consumer involvement in retail, particularly within the fashion sector, resulting in enhanced customer interaction, experiences, and satisfaction. Findings also suggest that AR and VR positively influence purchase decisions, and retail firms should merge virtual and physical commerce channels. These findings underscore the importance of augmented reality and virtual reality technologies as catalysts that improve the operations of the E-commerce business.

Originality: This study significantly contributes to the literature on AR, VR and e-commerce, hence adding to the current body of knowledge. The literature review from verified sources enhances the trustworthiness and credibility of the findings. The results indicate the path for further study.

Paper Type: Review of Literature

Introduction

The globe is developing likely due to the continuous advancement of marketing innovation technologies (Ahmed et al., 2019). The recent advancements in marketing technology that are gaining academic attention include AR and VR (Tsai, 2020). AR is a technology that integrates the real world with computer-generated information, creating an integrated space from the user's perspective (Bonetti et al., 2018). In simple terms, it merges the real and virtual worlds through a digital overlay that enriches the user's perception by incorporating graphics, textual information, or other digital data. On the other hand, VR is a technology that offers an interactive and immersive life-like experience produced by a computer. The user has a VR gadget that necessitates intense concentration on digital information, thereby isolating him from the actual world (Khanna et al., 2017). These technologies are swiftly integrating into several sectors, including e-commerce, to enhance customer experience and augment the sales platform (Applications & Road, 2021) via innovative marketing and advertising methods (Tsai, 2020). Web-based e-commerce services have been accessible since the mid-1990s, when internet tools and services became globally accessible (Park & Lee, 2004). E-commerce refers to the use of electronic communications and digital information processing technologies in commercial transactions to establish, modify, and redefine connections for value creation among organisations and between organisations and people. The primary categories of electronic commerce include: business-to-business (B2B), business-to-consumer (B2C), business-to-government (B2G), consumer-to-consumer (C2C), and mobile commerce (m-commerce) (C. Nisha & G. Sangeeta, 2012). In recent years, e-commerce has expanded to include shopping both on-the-go and from the comfort of home (Park & Lee, 2004), with customers increasingly engaging in the online browsing and purchasing of fashion and apparel goods (Dulabh et al., 2018). The COVID-19 pandemic has significantly transformed online purchasing behaviours, leading to an unprecedented rise in the number of consumers engaging in virtual shopping (Grewal et al., 2017; Wedel et al., 2020; Stubbs, 2020). In response to rapid advancements in interactive technologies, an increasing number of retailers are adopting emerging technologies such as augmented reality (AR) and virtual reality (VR) to deliver an engaging, efficient, and pleasurable virtual shopping experience (Grewal et al., 2017; Wedel et al., 2020). Conventional e-commerce systems provide two-dimensional product displays to consumers, along with restricted alternatives and flexibility.

E-commerce is a rapidly evolving phenomenon. AR and VR-based technologies address this disparity by enhancing product display and giving customers a more liberated and adaptable buying environment and experience (Estifaei et al., 2010). Consequently, the virtual reality environment significantly influences client perceptions of online buying and revitalises the e-commerce sector. It resulted in improved consumer behaviour, perception, attitude, and engagement with the goods. It provides the seller with a comprehensive understanding of the customer's attitude, enabling an increase in sales while offering the user both convenience and amusement. This environment is crucial for anticipating customer wants and enabling businesses to identify the appropriate audience, hence enhancing the E-Commerce Market and fostering trust between customers and sellers (Gupta, 2021).

The literature review of the current body of published work has been directed by the following objectives: To explore the influence of AR and VR technologies on consumer engagement and behaviour in e-commerce, along with the potential advancements of AR and VR in reshaping the e-commerce industry.

Research Methodology

A literature review of academic articles, industry reports, and case studies published in the last 7 years was conducted to assess the role of AR and VR in e-commerce. The sources were retrieved from academic databases such as Google Scholar, Scopus, IEEE Xplore, and industry reports. The keywords used for search include terms such as "AR and VR in E-Commerce," "AR in e-commerce," "VR shopping experience," "virtual retail", "E-Commerce and VR," and "immersive technologies in online shopping."

Review of Literature

Table 1: Review of Literature

AUTHORS	OBJECTIVES	FINDINGS
Ernestivita, (2024)	To analyze the impact of AR on consumer immersion in physical stores and ecommerce and the influence of AR on consumer satisfaction in various retail contexts.	AR enhances consumer immersion, experience satisfaction, and loyalty in retail contexts and positively impacts consumer behavior and engagement in retail environments.

AUTHORS	OBJECTIVES	FINDINGS
Liu et al., (2024)	To investigate the influence of augmented reality technology on retail and customer purchasing behaviours and to examine the shift from conventional retail to virtual try-on experiences.	Augmented reality technology promotes consumer buying by offering immersive and engaging experiences, facilitating virtual try-ons and comprehensive product presentations, increasing customer confidence, improving decision-making efficiency, and reducing cognitive load. Research demonstrates the many uses of augmented reality in retail, improving shopping experiences.
Ngoc Bao Tran,(2024)	To investigate augmented reality technology and its impact on consumer engagement and purchase behaviour.	Augmented reality stimulates customer engagement and purchasing behaviour via immersive experiences. The personalisation and customisation of augmented reality content positively influence customer behaviour.
Negm, (2024)	To analyze AR attributes for consumer value, brand engagement, purchase intentions and their impact on the shopping process, value creation and brand engagement.	Augmented reality qualities contribute to hedonic and utilitarian values that affect purchase intentions and boost brand engagement via consumer content consumption and development. AR developers and marketers may use information to enhance brand strategy.
Wijaya and Valerie, (2024)	To examine the adoption of augmented reality in online commerce and its influence on purchasing behaviour, as well as to assess virtual presence, device usability, and consumer decision-making influenced by pleasure.	The enhancement of virtual presence and gadget usability improves online purchasing pleasure, although enjoyment does not directly influence purchase intention in this context. Acquainting customers with the advantages of augmented reality elevates their propensity to buy, while integrating virtual product previews augments customer contentment and pleasure.
Dinana and Attia, (2024)	To examine the effects of virtual commerce and traditional shopping on consumer behaviour and to analyse how virtual commerce affects customer attitudes and behaviours.	The study demonstrates that augmented reality influences consumer engagement, product visualisation, and purchasing decisions. Retail brands in Egypt should integrate virtual and physical commerce channels, as the customer shopping experience positively impacts brand advocacy and loyalty. Furthermore, brand advocacy is shaped by favourable purchasing experiences and interactions.
AL Hilal, (2023)	To investigate the influence of augmented reality on the buying behaviour of Saudi customers using descriptive methodologies, and to analyse the relationships among augmented reality variables, dimensions, and the shopping experience.	Augmented reality favourably impacts Saudi customer purchasing choices and experiences, indicating that women and married persons have more favourable perceptions of augmented reality. Augmented reality facilitates consumer visualisation of goods via interpretative and embodied connections, with clothing and accessories being the most often bought items. This technology boosts marketing communications and brand recognition in Saudi Arabia.
Syeda Bushra Qadri et al., (2023)	To examine the influence of AR applications on consumer perceptions and experiences and to evaluate AR applications in contrast to traditional websites within retail settings.	Augmented reality applications improve consumer engagement and satisfaction relative to websites. AR technology delivers vibrant, immersive experiences that evoke user emotions and enthusiasm, hence favourably affecting customer attitudes and purchase behaviour.

AUTHORS	OBJECTIVES	FINDINGS
Pfeiffer, (2023)	To examine customer behaviour in virtual retail environments using XR technology and to analyse the influence of personalised help systems on mitigating cognitive strain.	Virtual reality impacts consumer choice and information search behaviour and virtual commerce enhances customer experience through immersive technologies. Personalization in virtual environments is based on abundant data collection.
Kim et al., (2023)	To investigate the influence of augmented reality on website quality, interactivity, and vividness, and to ascertain the moderating function of non-fungible tokens in the impacts of augmented reality on media.	An AR-based display boosts website quality, interaction, and vibrancy, hence improving customer engagement and overall website performance. Augmented reality (AR) favourably impacts customer assessments and purchasing inclinations.
Voicu et al., (2023)	To ascertain the determinants affecting augmented reality application use in cosmetic online purchasing and to evaluate their influence on customer behaviour within e-commerce.	Social value, fit assurance, and immersion substantially affect customer behaviour. Fit confidence, innovativeness, and perceived utilitarian value influence the utilisation of AR applications. AR applications enhance the online makeup shopping experience and stimulate product purchases, while social value and perceived hedonistic value factors affect the adoption of AR applications.
Gabriel et al., (2023)	To assess the influence of augmented reality on beauty and fashion items in e-commerce and to examine the variables influencing user intention to persist in using augmented reality within e-commerce.	The interaction, novelty, and hedonic value substantially influence continuation intention, whereas AR continuance intention greatly impacts purchase intention in e-commerce. The informativeness and vividness of the product do not influence hedonic value in the augmented reality scenario.
Voicu et al., (2023)	To ascertain the parameters affecting augmented reality application use in cosmetic e-commerce and the interrelations among key determinants in online retail.	Social value, fit assurance, and immersion substantially affect consumer behaviour, whereas fit confidence, innovativeness, and perceived utilitarian value influence the utilisation of AR applications. Enhance the online beauty purchase experience by including social value and immersive elements.
Prodea and Constantin, (2023)	To evaluate the influence of augmented reality on consumer decision-making and the improvement of marketing strategies.	Augmented reality favourably impacts customer selection, engagement, and decision-making while successfully enhancing marketing efforts by directing consumer behaviour.
Kumar and Srivastava, (2022)	To analyse the influence of augmented reality on online impulsive purchasing of high-involvement items and to explore the mediating effects of flow and spatial presence in augmented reality.	Augmented reality (AR) affects online impulsive behaviour by offering hedonic value and mitigating risk, whereas flow and spatial presence moderate the connection between AR attributes and behaviour. Augmented reality boosts consumer experience, changes behaviour, and mitigates product risk.
Akash and Tajamul, (2022)	To find out the influence of augmented reality on consumer engagement, loyalty, behaviour, and purchasing choices; and to assess the efficacy of augmented reality marketing in improving customer experiences.	Augmented reality (AR) strongly influences consumer engagement, loyalty, behaviour, and purchasing choices, successfully boosts brand recognition, customer retention, and market growth, and favourably correlates with the acceptability of Augmented Reality Marketing (ARM) in relation to customer engagement and loyalty.

AUTHORS	OBJECTIVES	FINDINGS
Quattelbaum et al., (2022)	To explore the impact of VR and AR on clothing purchase decisions and user acceptance of virtual product representation in AR and VR and to analyze obstacles to broader acceptance of VRAR in the fashion industry.	VR technologies face resistance in the purchase decisions of clothing and AR applications are preferred over VR for purchase decisions. Consumers insist on real-world inclusion in clothing purchases.
Kazmi et al., (2021)	To investigate AR's impact on consumer behaviour and buying intention in the fashion industry and the influence of AR on user experience and attitude.	AR impacts user experience, attitude, and buying intention positively towards the fashion industry. The user familiarity with AR apps moderates attitude and user experience, while experiential marketing enhances user satisfaction and brand value.
Applications and Road, (2021)	To examine the influence of AR/VR on e-commerce and consumer psychology.	Augmented reality (AR) and virtual reality (VR) augment the e-commerce experience, affect purchasing behaviour, and boost revenues, while good emotions in VR settings foster profound immersion and presence.
Caboni and Hagberg, (2019)	To evaluate augmented reality in retail, examine its uses and value.	Augmented reality boosts retail environments both online and in physical locations for customers and merchants, improving product tangibility and interactivity for consumers. Three primary augmented reality applications in retail: online web-based, in-store, and mobile applications. Augmented reality offers value via interaction, experience, engagement, knowledge, entertainment, and fulfilment.

Source: Author's Own

Discussion

The study reveals that the integration of augmented reality and virtual reality in e-commerce is advancing quickly, offering various opportunities and challenges that require thorough analysis. This literature review emphasises to investigate the influence of AR and VR technologies on customer engagement and behaviour in e-commerce, as well as the prospective developments of AR and VR in transforming the e-commerce industry (Caboni and Hagberg, 2019). While, AR and VR allow customers to check out items in their actual settings or interact with them virtually, thereby linking online and physical purchases (Liu et al., 2024). Furthermore, the literature suggests that AR and VR enhance the shopping experience as well as fostering greater customer satisfaction (Enyejo et al., 2024). In addition, these technologies have the potential to enhance customised shopping experiences by customising product recommendations based on customer preferences and choices (Ngoc Bao Tran, 2024). This is a significant asset in today's competitive e-commerce industry (Akash and Tajamul, 2022). Nevertheless, certain challenges impede the widespread use of AR and VR in e-commerce, despite the promising advancements (Kazmi et al.,2021; Quattelbaum et al., 2022). Higher implementation costs, the need for modern technological infrastructure, and varying degrees of customer acceptability all contribute to significant obstacles. Furthermore, there exists a potential risk of affecting users with excessive information or extremely complex interfaces, which may divert from the shopping experience instead of enhancing it. When implementing these technologies, it becomes necessary for the organisations to maintain a balance between innovation and user-friendliness. Ongoing technological progress and increasing customer acculturation to these technologies are signs that the prospects for AR and VR in e-commerce are favourable. As the industry expands, there should be a more comprehensive integration of AR and VR into e-commerce platforms.

Future Research

Future research could focus on comprehending consumer experiences using augmented reality and virtual reality in e-commerce. Performing thorough cost-benefit studies of the use of AR and VR technologies in diverse retail environments may provide significant insights. With the evolution of AR and VR technologies, future research may explore the integration of developing technologies into e-commerce. Future research may investigate the effects of augmented reality and virtual reality on consumer behavior over time that may provide profound insights into their influence on purchase choices and customer loyalty. The present study can be extended in the future by incorporating existing literature to conduct a systematic literature review and bibliometric analysis on augmented reality (AR) and virtual reality (VR) advancements in e-commerce. Additionally, an independent qualitative or quantitative study may be undertaken, concentrating only on the future of AR/VR in e-commerce. Future research may also study the impact of implementation of these technologies by organizations to acquire a competitive edge, foster expansion, and improve customer experiences in a more digital market.

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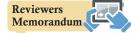
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Annexure 16.2.10

Submission Date	Submission Id	Word Count	Character Count
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7	**4**	**A**	A-Satisfactory (0-10%) B-Upgrade (11-40%) C-Poor (41-60%) D-Unacceptable (61-100%)
SIMILARITY %	MATCHED SOURCES	GRADE	

LOCATION	MATCHED DOMAIN	%	SOURCE TYPE
1	REPOSITORY - Submitted to Exam section VTU on 2024-08-01 12-05 1030752	3	Student Paper

2	tecnoscientifica.com	2	Publication
3	www.hindawi.com	1	Internet Data
4	Maturity models in LIS study and practice by Tiwari-2021	1	Publication

Reviewers Memorandum

Reviewer's Comment 1: The paper provides a comprehensive and well-structured literature review on the role of Augmented Reality (AR) and Virtual Reality (VR) in e-commerce. It effectively highlights the potential of these technologies to enhance customer engagement and influence purchase behavior. By focusing on the fashion sector, where AR and VR are being increasingly adopted, the study offers relevant insights into their transformative impact on online shopping experiences. The research is timely and addresses an important gap in the current literature, making it a valuable contribution to understanding the evolving nature of consumer interactions in the digital marketplace.

Reviewer's Comment 2: While the literature review is thorough and well-organized, the absence of empirical data or real-world case studies limits the practical applicability of the findings. The paper primarily relies on secondary sources, which provide valuable theoretical insights, but a more robust analysis of actual implementations of AR and VR in e-commerce would strengthen the conclusions. Additionally, expanding the focus beyond the fashion sector to other industries would make the findings more universally applicable and highlight the broader potential of AR and VR technologies.

Reviewer's Comment 3: The paper could benefit from the addition of visual elements, such as figures or charts, to enhance the clarity of the findings. For example, a flowchart depicting the customer journey in AR/VR-enabled e-commerce environments or a comparison of key AR and VR technologies used across different sectors would provide readers with a clearer understanding of the research. Overall, the paper offers valuable insights into the current state and future prospects of AR and VR in transforming the e-commerce landscape
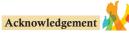
Conflict of Interest: Author of a Paper had no conflict neither financially nor academically.

Editorial Excerpt

The article has 7% plagiarism, which is within the accepted percentage as per the norms and standards of the journal for publication. As per the editorial board's observations and blind reviewers' remarks, the paper had some minor revisions, which were communicated promptly to the authors (Himani and Subodh), and all necessary corrections were incorporated as and when directed. The comments related to this manuscript are closely aligned with the theme "**The Role of AR and VR in Shaping E-Commerce**" both subject-wise and research-wise. The article presents a comprehensive study of the influence of augmented reality and virtual reality technologies on customer engagement and behavior in the e-commerce sector. However, to further enrich the paper, it would be beneficial to include case studies or empirical data showcasing the practical applications of AR and VR in various industries. After thorough reviews and the editorial board's remarks, the manuscript has been categorized and approved for publication under the "**Review of Literature**" category.

Acknowledgement

The acknowledgement section is an essential part of all academic research papers. It provides appropriate recognition to all contributors for their hard work and effort taken while writing a paper. The data presented and analyzed in this paper by the author (Himani and Subodh) were collected first handily and wherever it has been taken the proper acknowledgment and endorsement depicts. The author is highly indebted to others who facilitated accomplishing the research. Last but not least, endorse all reviewers and editors of GJEIS in publishing in the present issue.

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