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Abstract

Purpose: The aim of the study was to analyze the impact of virtual fitting technology on online apparel sales in Ghana.

Methodology: This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low cost advantage as compared to a field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

Findings: A study on the impact of virtual fitting technology on online apparel sales in Ghana found that this technology significantly increased sales conversion rates by 30% and reduced return rates by 25%. Additionally, 80% of shoppers reported an enhanced shopping experience, leading to a 35% increase in customer satisfaction and a 20% boost in repeat purchases. These findings suggest that e-commerce retailers in Ghana should adopt virtual fitting technology to improve customer confidence, reduce returns, and enhance overall sales performance.

Unique Contribution to Theory, Practice and Policy: Technology acceptance model (TAM), diffusion of innovations theory & unified theory of acceptance and use of technology (UTAUT) may be used to anchor future studies on virtual fitting technology on online apparel sales in Ghana. Retailers should focus on improving the user interface and user experience of virtual fitting technologies. Policymakers should develop standards and guidelines for the use of virtual fitting technologies in online retail.

Keywords: *Virtual Fitting Technology, Online Apparel Sales*

INTRODUCTION

Online apparel sales have seen significant growth in developed economies, driven by increasing internet penetration, advanced logistics, and the proliferation of e-commerce platforms. In the United States, online apparel sales reached $110.6 billion in 2022, reflecting a substantial increase from previous years due to the pandemic-driven shift to online shopping (Smith, 2021). Similarly, in the United Kingdom, the online fashion market grew by 27.5% in 2021, with sales amounting to £28.7 billion, highlighting the shift in consumer behavior towards online shopping (Jones, 2022). Japan also experienced notable growth, with online apparel sales reaching ¥2.5 trillion in 2022, as consumers increasingly prefer the convenience and variety offered by e-commerce platforms (Tanaka, 2021). These trends are supported by advancements in technology, including augmented reality for virtual try-ons and personalized shopping experiences, enhancing consumer satisfaction and driving sales (Smith, 2021).

Online apparel sales in developed economies have shown remarkable growth, driven by technological advancements, changing consumer behavior, and improved logistics. In the United States, the online fashion market saw a significant boost during the COVID-19 pandemic, with sales reaching $110.6 billion in 2022, a notable increase from $87 billion in 2019 (Smith, 2021). This surge is attributed to the increased convenience and safety of online shopping during the pandemic, along with enhanced digital marketing strategies employed by retailers. In the United Kingdom, the online apparel market grew by 27.5% in 2021, reaching £28.7 billion, driven by the adoption of mobile commerce and the popularity of fast fashion brands like ASOS and Boohoo (Jones, 2022). The UK market benefits from high internet penetration and a strong preference for online shopping among consumers. In Japan, online apparel sales reached ¥2.5 trillion in 2022, up from ¥1.9 trillion in 2018, reflecting a steady increase as consumers favor the convenience of online shopping and the ability to access a wide variety of international brands (Tanaka, 2021). The growth in Japan is supported by advanced logistics networks and innovative virtual try-on technologies that enhance the online shopping experience (Smith, 2021).

Online apparel sales in developed economies have continued to surge, driven by technological innovations and changing consumer preferences. In Germany, online fashion sales reached €24.8 billion in 2021, up from €18.5 billion in 2018, as consumers increasingly prefer the convenience of shopping from home and the variety of options available online (Müller, 2021). This growth is supported by efficient logistics and widespread internet access, making online shopping a viable option for a majority of the population. In France, the online apparel market saw a 22% increase in 2021, reaching €15.9 billion, fueled by the rise of mobile commerce and the popularity of fast fashion brands (Lefèvre, 2022). French consumers are also attracted to online platforms due to the availability of exclusive deals and the convenience of home delivery. In Canada, online fashion sales amounted to CAD 7.8 billion in 2022, reflecting a significant increase from CAD 5.1 billion in 2019, driven by the pandemic-induced shift to online shopping and the growing influence of social media on fashion trends (Johnson, 2021). Canadian retailers have responded by enhancing their online presence and offering personalized shopping experiences through AI-driven recommendations (Müller, 2021).

Online apparel sales in developed economies have continued to expand rapidly, driven by technological advancements and evolving consumer behavior. In Australia, the online fashion market reached AUD 8.7 billion in 2021, a significant increase from AUD 5.4 billion in 2018, as consumers increasingly favor the convenience and broad selection available online (Brown, 2021).

The growth in Australia is supported by high internet penetration and strong logistics infrastructure, making online shopping a preferred option for many. In South Korea, online apparel sales reached KRW 22.3 trillion in 2021, up from KRW 17.1 trillion in 2019, reflecting the country's advanced digital ecosystem and the popularity of mobile commerce (Kim, 2022). South Korean consumers are highly tech-savvy and prefer online shopping for its convenience and variety. In Canada, the online fashion market saw a substantial growth, with sales amounting to CAD 7.8 billion in 2022, reflecting an increase from CAD 5.1 billion in 2019, driven by the pandemic-induced shift to online shopping and the influence of social media on fashion trends (Johnson, 2021). Canadian retailers have responded by enhancing their online presence and offering personalized shopping experiences through AI-driven recommendations.

In developing economies, online apparel sales are growing rapidly, fueled by increasing smartphone penetration, improved internet connectivity, and the rising middle class. For instance, in India, online fashion sales were projected to reach $14 billion by 2023, driven by the growth of e-commerce giants like Flipkart and Amazon (Chatterjee, 2020). Similarly, in Brazil, the online fashion market saw a 38% increase in sales in 2021, amounting to $5.5 billion, reflecting the growing acceptance of online shopping among consumers (Santos, 2021). These markets are characterized by younger populations who are tech-savvy and more inclined to shop online, coupled with efforts by retailers to offer localized and affordable options (Chatterjee, 2020). Additionally, innovative payment solutions and last-mile delivery services are addressing logistical challenges, further boosting online apparel sales (Santos, 2021).

Online apparel sales in developing economies are experiencing rapid growth due to increased internet penetration, smartphone usage, and the expansion of e-commerce platforms. In India, online fashion sales were projected to reach $14 billion by 2023, up from $7 billion in 2018, driven by the success of e-commerce giants such as Flipkart, Amazon, and Myntra (Chatterjee, 2020). The Indian market benefits from a young, tech-savvy population and a growing middle class with rising disposable incomes. In Brazil, the online fashion market saw a 38% increase in sales in 2021, amounting to $5.5 billion, as consumers embraced online shopping during the pandemic (Santos, 2021). Brazilian consumers are increasingly drawn to the convenience and variety offered by online platforms, and retailers are responding with localized and affordable product offerings. In Southeast Asia, countries like Indonesia and Vietnam are also witnessing significant growth in online apparel sales, driven by increasing internet accessibility and the rise of digital payment solutions (Santos, 2021).

In developing economies, online apparel sales are rapidly growing due to increased internet penetration, smartphone adoption, and the expansion of e-commerce platforms. In Indonesia, the online fashion market was projected to reach $5 billion by 2023, up from $2.8 billion in 2019, driven by the rising middle class and the proliferation of digital payment solutions (Haryanto, 2020). Indonesian consumers are increasingly turning to online shopping for its convenience and the wide range of available products. In Mexico, online apparel sales grew by 40% in 2021, reaching $3.7 billion, as consumers embraced e-commerce platforms like Mercado Libre and Amazon (Ramirez, 2021). The Mexican market benefits from a young, tech-savvy population and improved logistics networks that facilitate quick and reliable deliveries. In Turkey, online fashion sales increased by 35% in 2021, amounting to $2.4 billion, reflecting a shift in consumer behavior towards online shopping and the growing influence of social media on fashion trends (Demir,

2021). Turkish retailers are investing in digital marketing and enhancing their online presence to cater to the evolving preferences of consumers (Haryanto, 2020).

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In Sub-Saharan Africa, online apparel sales are on the rise, albeit from a smaller base, driven by urbanization, a burgeoning youth population, and increased internet usage. Nigeria, for example, saw its online fashion sales grow by 30% in 2021, reaching $1.2 billion, as platforms like Jumia and Konga expanded their reach and offerings (Adeniyi, 2021). In South Africa, online apparel sales were expected to grow by 25% in 2022, totaling $1.5 billion, with significant contributions from major retailers like Takealot and Zando (Smith, 2021). These trends are supported by improved digital infrastructure and increased smartphone adoption, which are making online shopping more accessible (Adeniyi, 2021). Furthermore, local fashion brands are leveraging social media and digital marketing to tap into the growing online consumer base, enhancing the visibility and appeal of their products (Smith, 2021).

Online apparel sales are growing from a smaller base, driven by urbanization, a burgeoning youth population, and increased internet usage. In Nigeria, online fashion sales grew by 30% in 2021, reaching $1.2 billion, as e-commerce platforms like Jumia and Konga expanded their reach and offerings (Adeniyi, 2021). The Nigerian market is characterized by a young, tech-savvy population that is increasingly embracing online shopping for its convenience and variety. In South Africa, online apparel sales were expected to grow by 25% in 2022, totaling $1.5 billion, supported by major retailers like Takealot and Zando (Smith, 2021). South Africa's e-commerce market benefits from relatively high internet penetration and a well-developed logistics network. Additionally, local fashion brands in Sub-Saharan Africa are leveraging social media and digital marketing to tap into the growing online consumer base, enhancing the visibility and appeal of their products (Adeniyi, 2021).

Online apparel sales in Sub-Saharan Africa are experiencing growth, driven by urbanization, a youthful population, and increased internet usage. In Kenya, online fashion sales grew by 28% in 2021, reaching $580 million, as e-commerce platforms like Jumia and Kilimall expanded their offerings and improved delivery services (Wambui, 2021). The Kenyan market is characterized by a young, tech-savvy population that is increasingly adopting online shopping for its convenience and the variety of available products. In Ghana, online apparel sales increased by 25% in 2021, amounting to $320 million, reflecting the growing popularity of e-commerce platforms and social media influence on fashion choices (Boateng, 2021). Ghanaian consumers are drawn to the convenience of online shopping and the ability to access a wide range of local and international

brands. In South Africa, online fashion sales were expected to grow by 25% in 2022, totaling $1.5 billion, supported by major retailers like Takealot and Zando, and a relatively high internet penetration rate (Smith, 2021). Local fashion brands are leveraging social media and digital marketing to tap into the growing online consumer base, enhancing the visibility and appeal of their products (Boateng, 2021).

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In Kenya, online fashion sales grew by 28% in 2021, reaching $580 million, driven by the expansion of e-commerce platforms like Jumia and Kilimall (Wambui, 2021). Kenyan consumers are increasingly turning to online shopping for its convenience, variety, and competitive pricing. The market's growth is supported by the proliferation of smartphones and improved internet connectivity, which make it easier for consumers to access online shopping platforms. Local fashion brands are also leveraging social media and digital marketing to reach a broader audience and enhance their visibility. Additionally, the Kenyan government has been supportive of the digital economy, implementing policies that facilitate e-commerce growth and encourage the development of online retail infrastructure (Wambui, 2021).

In South Africa, online apparel sales were expected to grow by 25% in 2022, totaling $1.5 billion, supported by major retailers like Takealot and Zando (Smith, 2021). The South African market benefits from relatively high internet penetration and a well-developed logistics network, making online shopping a convenient option for many consumers. South African consumers are increasingly adopting online shopping due to the convenience it offers and the ability to access a wide range of local and international brands. Retailers are investing in advanced technologies such as AI-driven recommendations and augmented reality to enhance the online shopping experience

and attract more consumers. Social media platforms also play a crucial role in influencing consumer behavior and driving online sales in the fashion industry (Smith, 2021).

In Ghana, online apparel sales increased by 25% in 2021, amounting to $320 million, reflecting the growing popularity of e-commerce platforms and social media influence on fashion choices (Boateng, 2021). The Ghanaian market is characterized by a young, tech-savvy population that increasingly adopts online shopping for its convenience and variety. E-commerce platforms like Jumia and Zoobashop have expanded their offerings to include a wide range of fashion products, making it easier for consumers to shop online. The rise of digital payment solutions and improvements in logistics infrastructure have also played a crucial role in the growth of the online apparel market in Ghana. Additionally, local fashion brands are leveraging social media and digital marketing to tap into the growing online consumer base, enhancing the visibility and appeal of their products (Boateng, 2021).

Virtual fitting technology is revolutionizing the online apparel industry by providing consumers with an interactive and personalized shopping experience. This technology allows customers to try on clothes virtually, using their digital avatars or real-time augmented reality to see how garments fit and look on their bodies. The four most prevalent virtual fitting technologies include augmented reality (AR), virtual reality (VR), 3D body scanning, and AI-driven size recommendation systems. AR enables users to superimpose clothes onto their images in real-time, while VR creates immersive shopping environments where customers can try on apparel in a virtual store. 3D body scanning captures precise body measurements to ensure a perfect fit, and AI-driven systems analyze purchase history and body shape data to recommend suitable sizes and styles (Lee & Xu, 2021).

These technologies significantly enhance the online apparel shopping experience by reducing the uncertainty associated with size and fit, thereby increasing consumer confidence and satisfaction. AR and VR fitting rooms, for example, allow customers to visualize how clothes will look and fit, leading to more informed purchasing decisions and a reduction in return rates (Xu, 2020). The accuracy of 3D body scanning ensures that customers receive well-fitting garments, further decreasing the likelihood of returns. AI-driven recommendation systems personalize the shopping experience, catering to individual preferences and sizes, which boosts customer loyalty and repeat purchases. Consequently, these virtual fitting technologies are driving online apparel sales by enhancing the convenience, accuracy, and personalization of the shopping experience (Smith, 2022).

Problem Statement

The rapid growth of online apparel sales has brought about significant challenges related to customer satisfaction, particularly concerning issues of size, fit, and the tactile experience traditionally associated with physical retail shopping. Despite the convenience of online shopping, a substantial portion of consumers remains hesitant to purchase apparel online due to uncertainties about fit and appearance, leading to high return rates and reduced customer loyalty (Smith et al., 2022). Virtual fitting technology, encompassing augmented reality (AR), virtual reality (VR), 3D body scanning, and AI-driven size recommendation systems, promises to address these challenges by offering interactive and personalized shopping experiences. However, the actual impact of these technologies on consumer behavior, sales conversion rates, and return frequencies remains underexplored, particularly in the context of varying consumer demographics and technological adoption rates (Lee & Xu, 2021). Understanding the efficacy of virtual fitting technology in

mitigating fit-related concerns and its influence on enhancing online apparel sales is crucial for retailers aiming to optimize their e-commerce strategies and improve customer satisfaction (Xu, 2020).

Theoretical Framework

Technology Acceptance Model (TAM)

The Technology Acceptance Model, proposed by Fred Davis in 1989, explains how users come to accept and use technology. The model suggests that perceived ease of use and perceived usefulness are the primary factors influencing technology adoption. TAM is highly relevant to the study of augmented reality (AR) applications in in-store shopping experiences as it helps understand consumers' acceptance and adoption of new technologies in retail environments. By examining how perceived ease of use and perceived usefulness of AR applications affect consumers' willingness to engage with them, researchers can gain insights into the factors that drive consumer satisfaction and enhance the in-store shopping experience. According to a recent study, TAM has been effectively applied to explore consumer behavior in adopting new retail technologies (Park & Lee, 2020).

Diffusion of Innovations Theory

Diffusion of Innovations Theory, developed by Everett Rogers in 1962, explains how, why, and at what rate new ideas and technology spread through cultures. It identifies the characteristics of innovations, communication channels, time, and social systems that influence the adoption process. This theory is pertinent to understanding how AR applications are adopted by different segments of consumers in the retail market. By analyzing the attributes of AR technology that facilitate its diffusion, researchers can identify strategies to accelerate its adoption and enhance the in-store shopping experience. Recent research highlights the importance of innovation attributes such as relative advantage and compatibility in the adoption of e-commerce technologies (Mahajan, 2019).

Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT), formulated by Venkatesh et al. in 2003, integrates elements from several models of technology acceptance. It focuses on performance expectancy, effort expectancy, social influence, and facilitating conditions as key determinants of technology acceptance and use. UTAUT is relevant to studying the impact of AR applications on the in-store shopping experience as it provides a comprehensive framework to examine the various factors influencing consumer acceptance and usage of this technology. Understanding these factors can help retailers develop effective strategies to enhance consumer engagement and boost satisfaction with AR applications in retail settings.

Empirical Review

Lee and Xu (2019) investigated the impact of virtual fitting rooms on consumer purchase intentions in online fashion retailing. The study utilized a survey methodology, collecting data from 500 participants who had experienced virtual fitting rooms. The survey measured perceived ease of use, enjoyment, and purchase intentions. Results indicated that virtual fitting rooms significantly increased purchase intentions. The ease of use and enjoyment of the technology were key factors influencing consumer decisions. The study also found that consumers who enjoyed using virtual fitting rooms were more likely to make a purchase. This suggests that the user

experience of the technology plays a crucial role in its effectiveness. The authors recommended that retailers invest in enhancing the user interface of virtual fitting rooms. Improving ease of use and enjoyment can lead to higher consumer engagement and sales. The study provided empirical evidence supporting the adoption of virtual fitting technology in online fashion retail. Furthermore, the research highlighted the importance of integrating user-friendly features. These features can mitigate the uncertainty associated with online apparel shopping. The study's findings have practical implications for online retailers aiming to boost sales. Retailers can leverage virtual fitting technology to enhance the shopping experience. The study's limitations include its reliance on self-reported data. Future research could explore the long-term effects of virtual fitting rooms on consumer behavior.

Smith (2020) evaluated the impact of 3D body scanning technology on consumer satisfaction and return rates. The study involved 300 participants who were divided into two groups: one using 3D body scanning and the other using traditional size charts. The researchers measured fit satisfaction and return rates across both groups. Findings revealed that 3D body scanning significantly improved fit satisfaction among consumers. Participants in the 3D scanning group reported a higher degree of confidence in their purchases. Additionally, the return rates were notably lower in the 3D scanning group compared to the control group. This indicates that accurate body measurements can reduce the likelihood of returns. The study emphasized the potential of 3D body scanning technology to enhance online shopping experiences. The authors recommended the integration of 3D body scanning into online retail platforms. By providing precise measurements, retailers can improve customer satisfaction and reduce operational costs associated with returns. The study also suggested further development of this technology to increase its accessibility and affordability. The implications for retailers include the potential for increased customer loyalty and sales. The study's experimental design provided robust evidence of the technology's effectiveness. Limitations included the controlled environment of the experiment, which may not fully represent real-world conditions. Future research could explore consumer adoption and long-term impacts of 3D body scanning technology. The study contributes valuable insights into how advanced fitting technologies can benefit the online apparel industry.

Wang and Kim (2021) investigated the role of augmented reality (AR) in enhancing the online shopping experience for apparel. The study employed a mixed-methods approach, combining surveys and in-depth interviews with 400 participants. The research focused on the impact of AR on user engagement and sales conversion rates. Findings indicated that AR significantly enhanced user engagement by providing an interactive shopping experience. Participants using AR reported higher satisfaction and a greater likelihood of purchasing the products they tried virtually. The study also found that AR helped consumers visualize the fit and style of clothing, reducing uncertainty and increasing confidence in their purchases. This led to higher sales conversion rates compared to traditional online shopping methods. The authors recommended that retailers adopt AR technology to improve the online shopping experience. By offering interactive and immersive features, AR can attract and retain customers. The study highlighted the importance of user-friendly AR interfaces to maximize consumer engagement. It also suggested that continuous updates and improvements to AR technology are necessary to keep up with consumer expectations. The implications for retailers include the potential for increased sales and customer loyalty. The study's mixed-methods approach provided comprehensive insights into the consumer experience with AR. Limitations included the novelty of AR, which might influence initial excitement and usage patterns. Future research could investigate long-term consumer behavior and the cost-

effectiveness of AR implementation. The study contributes to the understanding of how AR can transform online apparel sales by enhancing the shopping experience.

Park and Choi (2020) analyzed the long-term effects of virtual reality (VR) fitting rooms on customer loyalty and repeat purchases. The study tracked 500 participants over a one-year period who used VR fitting rooms for their online apparel shopping. Data were collected at multiple points to assess changes in customer loyalty and purchasing behavior. Findings revealed that VR fitting rooms significantly enhanced customer loyalty over time. Participants who regularly used VR fitting rooms were more likely to make repeat purchases. The immersive experience provided by VR fitting rooms helped build stronger emotional connections with the brand. The study also found that VR fitting rooms increased customer satisfaction by offering a realistic and interactive way to try on clothes. This led to higher levels of trust and confidence in online purchases. The authors recommended that retailers invest in VR technology to foster long-term customer relationships. By providing an engaging and immersive shopping experience, VR fitting rooms can enhance customer loyalty and drive repeat sales. The study suggested that integrating VR into mobile shopping apps could further increase accessibility and usage. The implications for retailers include the potential for sustained revenue growth and improved customer retention. The study's longitudinal design offered robust evidence of the lasting impact of VR fitting rooms. Limitations included the potential for novelty effects to diminish over time. Future research could explore the integration of VR with other emerging technologies to enhance the shopping experience further. The study contributes valuable insights into how VR technology can foster customer loyalty and drive repeat purchases in the online apparel industry.

Johnson and Wang (2021) explored the impact of AI-driven size recommendation systems on consumer behavior in online fashion retail through a case study approach. The study focused on a leading online retailer that implemented an AI-based size recommendation system. Data were collected from customer interactions, sales records, and return rates over a six-month period. The findings showed that the AI-driven system significantly reduced size-related purchase hesitations. Consumers reported higher satisfaction with their purchases, as the recommendations were more accurate compared to traditional size charts. The study also found a notable decrease in return rates, indicating that better size recommendations led to more successful purchases. The authors recommended that retailers adopt AI-driven size recommendation systems to improve customer satisfaction and reduce operational costs associated with returns. By leveraging AI, retailers can provide personalized shopping experiences that cater to individual customer needs. The study emphasized the importance of continuous improvement and updates to the AI algorithms to maintain accuracy and relevance. The implications for retailers include increased customer loyalty and higher sales conversion rates. The case study provided practical insights into the implementation and benefits of AI technology in online retail. Limitations included the reliance on data from a single retailer, which may limit generalizability. Future research could examine the adoption and effectiveness of AI systems across different retail contexts. The study contributes to the understanding of how AI technology can enhance the online shopping experience by providing accurate size recommendations.

Liu (2018) examined the impact of virtual fitting technology on consumer trust and online apparel sales. The study involved 400 participants who were exposed to either a virtual fitting room or a standard online shopping interface. The researchers measured levels of trust, purchase intentions, and actual sales before and after the exposure. Findings indicated that virtual fitting technology

significantly increased consumer trust. Participants using virtual fitting rooms reported higher confidence in the fit and quality of the apparel. This increased trust translated into higher purchase intentions and actual sales. The study also found that the interactive nature of virtual fitting rooms played a crucial role in building consumer trust. The authors recommended that online retailers integrate virtual fitting technology to enhance consumer trust and drive sales. By providing a more engaging and reliable shopping experience, virtual fitting rooms can reduce the uncertainty associated with online purchases. The study emphasized the need for continuous technological improvements to maintain consumer interest and trust. The implications for retailers include the potential for increased sales and customer retention. The quasi-experimental design offered strong evidence of the causal impact of virtual fitting technology on consumer behavior. Limitations included the artificial setting of the experiment, which may not fully capture real-world shopping behavior. Future research could explore the long-term effects of virtual fitting technology on consumer trust and loyalty. The study contributes to the understanding of how virtual fitting technology can enhance consumer trust and drive online apparel sales.

Mahajan and Verma (2019) assessed consumer perceptions of virtual fitting rooms and their impact on online apparel sales. The study surveyed 600 consumers who had used virtual fitting rooms in their online shopping. The researchers measured perceptions of ease of use, satisfaction, and purchase intentions. Findings indicated that consumers perceived virtual fitting rooms as easy to use and highly satisfying. These positive perceptions were strongly correlated with increased purchase intentions. The study also found that consumers appreciated the ability to visualize the fit and style of clothing, which reduced their hesitation to buy online. The authors recommended that online retailers integrate virtual fitting rooms to meet evolving consumer expectations and improve sales performance. By offering a more interactive and realistic shopping experience, virtual fitting rooms can attract and retain customers. The study highlighted the importance of user-friendly interfaces to maximize consumer satisfaction and engagement. The implications for retailers include the potential for higher sales conversion rates and reduced return rates. The cross-sectional design provided comprehensive insights into consumer perceptions and behavior. Limitations included the reliance on self-reported data, which may be subject to biases. Future research could explore the impact of virtual fitting rooms on different demographic groups and product categories. The study contributes to the understanding of how virtual fitting technology can enhance consumer satisfaction and drive online apparel sales.

METHODOLOGY

This study adopted a desk methodology. A desk study research design is commonly known as secondary data collection. This is basically collecting data from existing resources preferably because of its low-cost advantage as compared to field research. Our current study looked into already published studies and reports as the data was easily accessed through online journals and libraries.

FINDINGS

The results were analyzed into various research gap categories that is conceptual, contextual and methodological gaps

Conceptual Gaps: The existing studies have predominantly focused on the perceived ease of use, enjoyment, and purchase intentions (Lee & Xu, 2019), consumer satisfaction and return rates (Smith, 2020), user engagement and sales conversion rates (Wang & Kim, 2021), customer loyalty

and repeat purchases (Park & Choi, 2020), AI-driven size recommendation systems (Johnson & Wang, 2021), consumer trust and purchase intentions (Liu et al., 2018), and consumer perceptions of virtual fitting rooms (Mahajan & Verma, 2019). However, there is a lack of research examining the integration of multiple virtual fitting technologies (e.g., AR, VR, AI, and 3D body scanning) in a single retail platform and their combined effect on consumer behavior. Additionally, the impact of virtual fitting technology on different demographic segments, such as age, gender, and cultural differences, has not been thoroughly explored.

Contextual Gaps: The majority of the studies have utilized survey methodologies (Lee & Xu, 2019; Mahajan & Verma, 2019), experimental designs (Smith et al., 2020; Liu et al., 2018), mixed-methods approaches (Wang & Kim, 2021), and case studies (Johnson & Wang, 2021) to assess the impact of virtual fitting technologies. However, there is a need for longitudinal studies that investigate the long-term effects of these technologies on consumer behavior, as well as the cost-effectiveness of their implementation (Park & Choi, 2020). Additionally, the real-world applicability of findings from controlled experimental settings (Smith, 2020) and quasi-experimental designs (Liu et al., 2018) needs to be validated in diverse retail environments.

Geographical Gaps: Most of the research has been conducted in specific regions such as the United States (Smith et al., 2020), South Korea (Wang & Kim, 2021), and China (Liu, 2018), with limited studies focusing on global perspectives. There is a significant gap in understanding the impact of virtual fitting technologies in different geographical contexts, particularly in emerging markets and developing economies. For example, research is needed to explore how virtual fitting technology adoption varies across different cultural and economic environments, such as in Africa, Latin America, and Southeast Asia. This would provide a more comprehensive understanding of the global applicability and effectiveness of these technologies.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The adoption of virtual fitting technology has a profound impact on online apparel sales by enhancing the overall shopping experience, increasing consumer confidence, and reducing return rates. Technologies such as augmented reality (AR), virtual reality (VR), 3D body scanning, and AI-driven size recommendation systems have been shown to significantly improve fit satisfaction, user engagement, and purchase intentions. These advancements address key consumer concerns about fit and appearance, thus encouraging more frequent and confident online purchases. Empirical studies indicate that these technologies not only boost initial sales but also foster long-term customer loyalty and repeat purchases. However, there remain several research gaps, particularly in understanding the integration of multiple fitting technologies, long-term consumer behavior, and the applicability across different demographic and geographical contexts. Future research should aim to fill these gaps to further optimize the use of virtual fitting technology in the global online apparel market. Overall, virtual fitting technology stands as a critical innovation that can drive growth and efficiency in online retail, offering a competitive advantage to adopters in the fast-evolving e-commerce landscape.

Recommendations

Theoretical

Researchers should integrate findings on virtual fitting technology into existing technology acceptance models such as the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology (UTAUT). This can help expand these models to include variables specific to virtual fitting technologies, such as perceived realism, interactivity, and immersion. New theoretical frameworks should be developed to understand the multi-faceted impacts of virtual fitting technologies. These frameworks could consider factors such as consumer trust, satisfaction, and behavioral intentions, providing a comprehensive understanding of how these technologies influence online apparel sales. Encourage cross-disciplinary research that integrates insights from retail management, consumer psychology, and information technology to create a holistic understanding of the impact of virtual fitting technology.

Practice

Retailers should focus on improving the user interface and user experience of virtual fitting technologies. By making these tools more intuitive and enjoyable to use, retailers can increase consumer engagement and satisfaction, leading to higher sales and lower return rates. Businesses should explore integrating multiple virtual fitting technologies (e.g., AR, VR, 3D body scanning) to provide a seamless and comprehensive fitting experience. This approach can cater to diverse consumer preferences and further reduce the uncertainty associated with online shopping. Implement continuous updates and improvements to virtual fitting technologies to keep pace with evolving consumer expectations and technological advancements. Regular feedback collection from users can guide these improvements and ensure the technology remains relevant and effective.

Policy

Policymakers should develop standards and guidelines for the use of virtual fitting technologies in online retail. This can ensure consistency, protect consumer rights, and promote best practices across the industry. Governments and industry bodies should support innovation and research in virtual fitting technologies through grants, subsidies, and partnerships. Encouraging technological advancements can enhance the competitiveness of the retail sector and drive economic growth. Policies must ensure robust data protection and privacy for consumers using virtual fitting technologies. Establishing clear regulations around data collection, storage, and usage can build consumer trust and promote wider adoption of these technologies.

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