

Virtual Technologies in a Demand Virtualization Environment : Expanding the Potential of Fashion Brands

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Abstract

Purpose : This research aimed to evaluate the potential impact of implementing augmented reality (AR) on online sales by measuring customers' perceptions of augmented and physical reality in terms of size, fit, and aesthetic appearance parameters.

Methodology : The experimental sample comprised of 91 participants. Data collection involved a one-way analysis of variance with repeated measures. The within-subjects research method (repeated measures) was employed, wherein each participant tested all scenarios (in conditions of AR fitting and traditional physical fitting of clothing). The assessment of the variables' impact on shaping purchase intention was conducted using a multivariate analysis of variance.

Findings : It was demonstrated that AR ensures consistency in the overall impression of the product for the consumer; however, the correspondence between AR and real fitting has been only partially confirmed. The significance of self-perception during virtual try-ons in shaping purchase intention was underscored.

Practical Implications: The practical implications entailed recommending the implementation of AR solutions in online sales to enhance customer loyalty, reduce clothing returns, and increase loyalty to online purchases.

Originality : The study contributed to the further development of the "stimulus-organism-response" model for the conditions that AR shapes in online sales and provided new experimental data that aided fashion brands in leveraging the advantages of AR.

Keywords : augmented reality, fashion industry, innovative solutions, online sales, virtual try-on

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The market for smart wearable technologies is rapidly expanding (Gupta & Barkathunissa, 2022), and e-commerce is considered an effective means of global business expansion; thus, significant emphasis is placed on it, focusing on stimulating customers to make as many online purchases as possible (Agarwal et al., 2021). In the context of the growth of e-commerce, the importance of studying new technologies that will enhance the quality and efficiency of online shopping is increasing (Ricci et al., 2023). Companies that have implemented innovative developments in online stores have already achieved significant sales increases (Gu et al., 2021). However, industry leaders need to maintain online customer interest by employing modern interaction methods (Smink et al., 2020).

Undoubtedly, the potential of augmented reality (AR) in online sales has been within the scope of interest of contemporary researchers. New aspects of marketing influence have been explored (Tanwar et al., 2021), as well as the potential of advertising using AR and forecasting consumer reactions (Feng & Xie, 2019), opportunities to enhance sales strategies for fashion brands in virtualized demand environments (Beck & Cri , 2018), and the

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specifics of AR technologies for the fashion industry (Aagerup, 2022). Attention has been devoted to assessing the implementation of digital innovations by online shoppers (Stefko et al., 2022) as well as the impact of virtual solutions on the intention to purchase clothing online (Beck & Cri , 2018). Theoretical approaches in the field of technology acceptance have been developed (Mishra et al., 2021), determining that AR enhances interactivity for customers (Trunfio et al., 2022) and satisfaction with online purchases (Rauschnabel et al., 2019).

Nevertheless, there remains a limited amount of research dedicated to AR in the context of avatar use and its influence on online purchases (Zhu et al., 2024), thereby opening opportunities for new research on AR technologies for fashion brands in the virtualized demand environment (Boardman et al., 2020). For instance, it is necessary to elucidate the advantages of AR among online clothing presentation formats, although some studies have already laid a conceptual groundwork for this (Javornik, 2016). The majority of studies encompass an assessment of a very broad category of utilitarian benefits from the use of AR (Kumar et al., 2023).

Based on the above, further research is needed to expand the theoretical and practical understanding of consumer interaction with AR technologies in the fashion industry. This research aims to evaluate the potential impact of AR implementation on online sales by measuring customers' perceptions of augmented and physical reality regarding size, fit, and appearance parameters.

Literature Review

The Potential of AR to Increase Online Demand for Fashion Clothing

Mobile technologies, such as smartphones, tablets, and smart glasses, combined with AR technology, have created new opportunities for the fashion industry (Chylinski et al., 2020). The experience of working with brands gained increasing importance in the marketing literature (Sumbly & Siraj, 2019), especially in aspects related to brand-consumer relationships (Pawar & Raut, 2019). The enormous potential of AR lies in its ability to enhance the connection between customers and the products they purchase. AR increases customer satisfaction, boosts sales, stimulates conversion, and assists shoppers in making online purchases (Aslam & Davis, 2024).

Unsurprisingly, AR was actively integrated into the practices of large companies. For instance, Ikea utilized AR to allow customers to visualize interior items within their homes (Ozturkcan, 2021), while Hyundai and Mercedes have implemented AR guides for vehicles, resulting in increased conversion rates, enhanced customer

Table 1. AR Technology Examples in the Fashion Corporations' Online Sales Infrastructure

Brand	Use of AR Technology in Strategic Marketing Decisions
Prada	Invested in an application for virtual fitting that includes items from the product catalog and simulates them on the body, displaying joints, gravity effects, stretching, etc.
Macy's	They provide in-store try-ons with an AR mirror and online try-ons with a mobile app.
Carolina Herrera	The online fitting is available through a web platform where users can utilize interactive features to explore items (rotate them and visualize how they will look when worn).
Ralph Lauren	The application does not require a user's body image because it selects a suitable digital avatar and models clothing.
GAP	It allows users to try on clothing virtually in a dressing room on a 3D mannequin with various body types while respecting their features and requirements.
H&M	Introduced her first virtual clothing line in January 2022, inviting customers to "try on" virtual wardrobe items.
Burberry	Introduced her first virtual clothing line in January 2022, inviting customers to "try on" virtual wardrobe items.

Note. Adapted by the author based on Kang (2024) and Simbott (2024).

satisfaction, and loyalty (Boboc et al., 2020). Amazon was granted a patent for an “augmented reality magic mirror” in 2018, providing website visitors the capability to “try on” clothing without physically wearing it (Saprikis et al., 2021). Examples of how major fashion industry brands have integrated AR technology into their infrastructure to stimulate virtual demand are provided in Table 1.

AR increased conversion rates by offering a valuable compromise, allowing consumers to try on numerous items and visualize themselves in footwear, clothing, and accessories, thus stimulating purchases (Smink et al., 2020).

Theoretical Framework and Research Questions

The research is based on the Stimulus–Organism–Response (S–O–R) model. The basis for modeling and formulating hypotheses lay in the “Stimulus-Organism-Response” (SOR) model (Mehrabian & Russell, 1974), which proposed to explain the influence of environmental stimuli on human behavioral responses. According to the “environmental stimulus – human body – human response” model, signals such as sound, smell, light, touch, and others influence consumers' emotions and behavior. Signals had a positive effect on buyers, eliciting a desire to relive the experience or exert a negative impact, prompting visitors to interrupt their action and not return to it. The S–O–R structure was widely employed for analyzing the impact of new fashion clothing sales technologies on consumers' purchase intentions in the online environment (Watson et al., 2020). Park and Yoo (2020) found that AR technologies enhanced sensory perception and clothing visualization, thus contributing to a positive behavioral response.

The fashion industry utilized interactive visualization technologies to replicate the experience of trying on clothing online, allowing customers to examine products from different angles and assess how they would look themselves. To achieve this, virtual “avatars” were either tailored to precise parameters or visitors were digitally represented (Saprikis et al., 2021). It was also possible to attempt digitized clothing, creating the illusion of holding the dress or trousers in front of oneself, pressed against the body. Examples of contemporary AR technology are shown in Figures 1 to 3.

Figure 1. Example of Digitized Shoes Try-On



Note. Retrieved from the Shutterstock (2023) open source.

Figure 2. Example of How a “Magic Mirror” Helps to Choose Clothing



Note. Retrieved from the Shutterstock (2023) open source.

Figure 3. Example of Compiling AR Ready-Made Images in a Shop



Note. Retrieved from the iStockphoto (2023) open source.

Hence, some brands provided website visitors with a digitized 3D model of clothing using mirror technology to “try on” online apparel, envision how it would appear on their body, and shape their silhouette (Gallardo et al., 2018). The integration of AR into websites offered virtual fitting rooms (de Ruyter et al., 2020), enabling users to see their image overlaid onto the image of the garment in AR (Chylinski et al., 2020). AR, thus, could compete with conventional physical fitting, offering the buyer a high level of interaction and experience, as if they were trying on clothing in a real store (Baytar et al., 2020).

It is also important to understand whether the shopping experience in an AR environment is aligned with the final perception of purchased clothing.

➤ **RQ1** : Does AR technology during clothing try-ons provide a similar perception of its size, fit, and appearance compared to real-life try-ons?

Each AR experience offered to customers is aimed at enhancing their shopping experience. Digital cues support customer behavior, prompting them to make purchases, and virtual try-on is an effective method to persuade customers to buy products without the need for physical interaction (Zaveri & Amin, 2019).

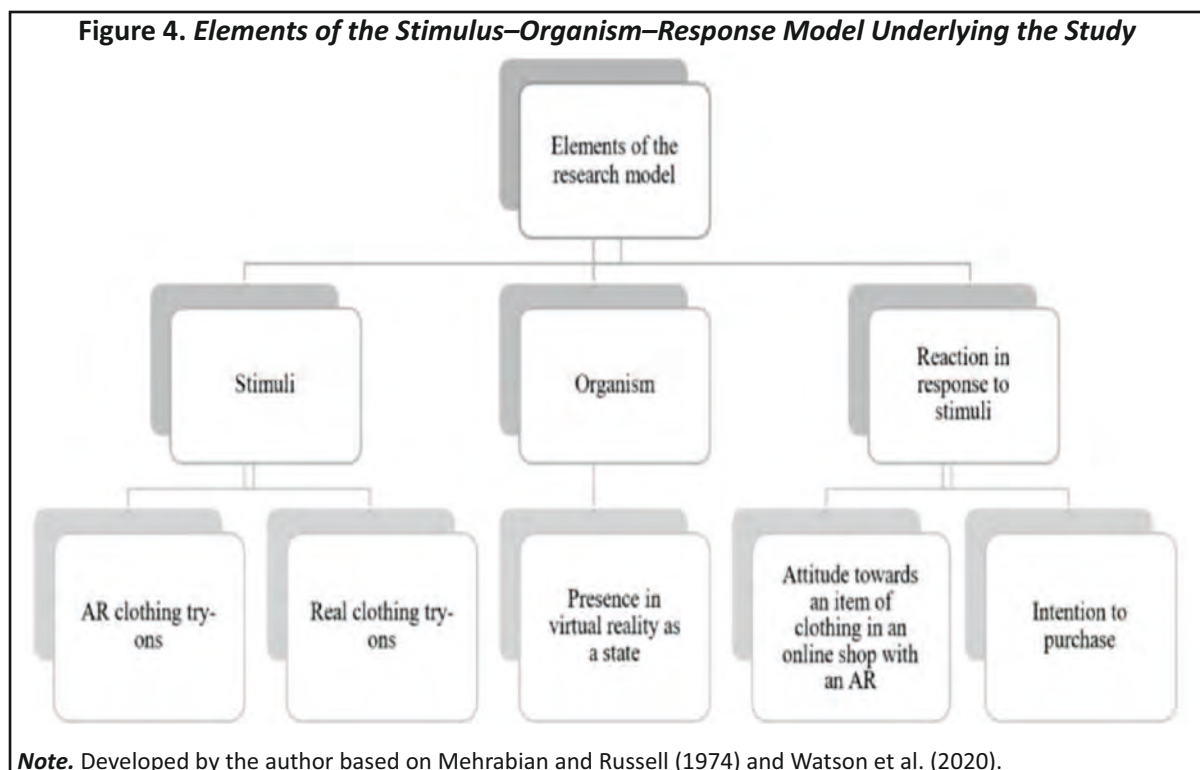
Thus, it was interesting to analyze how AR technologies could assist fashion brands in increasing profits and motivating online shoppers to make purchases. Therefore,

➤ **RQ2** : Can AR technology during clothing try-ons provide customers with the same effect in shaping their attitude toward the garment and intention to purchase it as a real-life try-on?

AR technologies facilitated the interaction of the buyer with the environment and the product. They established the psychological state of personal presence and provided visual cues to ease perception and decision-making when purchasing clothing (Miell, 2018). Chylinski et al. (2020) opened up new opportunities for brands in online sales, mitigating the shortcomings of traditional online purchases. However, the use of AR technologies in online stores may pose challenges if the buyers cannot properly perceive themselves as virtual “avatar,” hence it is important to understand how AR influences the decision to purchase clothing (Pantano et al., 2017).

➤ **RQ3** : Will customers with lower self-perception during AR try-ons have lower attitudes toward the clothing item and intentions to purchase compared to participants with higher self-perception?

The final S–O–R model and its main elements related to the research questions are presented in Figure 4.



Materials and Methods

Study Type

A quantitative analysis methodology was employed to achieve the research objectives, utilizing a questionnaire to assess clothing items and self-perception therein. The study took the form of an experiment.

Research Approach

The design of within-subject research (repeated measures) was selected so that each participant tested all scenarios. Experiment participants were invited to the research site, provided with instructions, and signed consent forms. A uniform approach was implemented for all, involving online product selection and real-life try-ons. During the experiment, participants tried on the same clothing item twice:

↳ **1st Occasion :** Participants utilized AR technology to try on the garment on a simulated avatar tailored to their measurements. They were provided with a technological device with a proprietary application enabling AR, allowing them to select a size and try on the dress. They adjusted their avatar based on body measurements and formed an overall impression of how the clothing looked on them, rotating the avatar to observe the fit and movement of the fabric from behind and in profile.

↳ **2nd Occasion :** Participants physically tried on the same dress.

The stages of the experiment followed the sequence depicted in Figure 5. The experimental research model's stimulus was a dress (Figure 6). The garment was selected because trying on a dress is an activity that consumes a significant amount of time for women. They need to assess the fit and familiarize themselves with the clothing size (Stolovy, 2021).

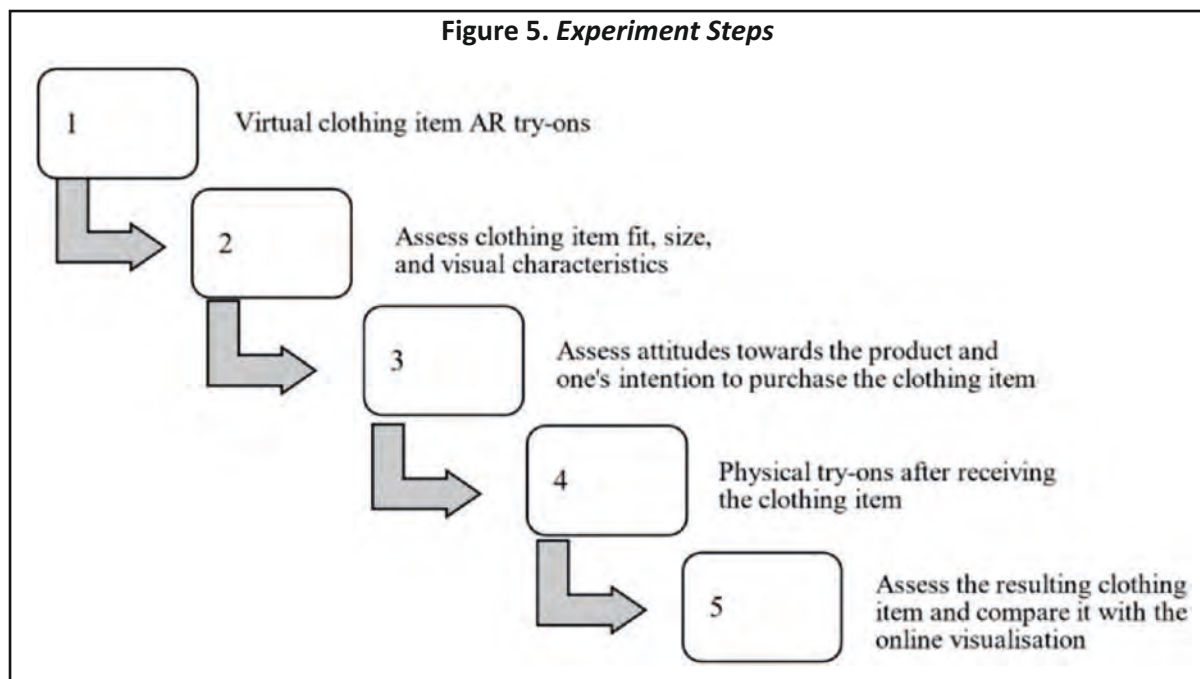


Figure 6. Example of the Experiment Stimulus Avatar Dress in Virtual Reality and on the Photo in an Online Shop



Note. The dress was selected from the Dressing Room by Gap AR.

The first questionnaire was completed after step 3, where the experimental participant responded to inquiries aimed at understanding their assessment of the product visualized through AR (dress size, fit, characteristics in virtual reality, sensations experienced during virtual try-on, attitude toward the product, and intention to purchase).

The second questionnaire was administered after step 5. After online measurements, participants downloaded the questionnaire onto their smartphones, visited a physical store, tried on the selected dress of the desired size, and then answered questions evaluating the physically tested item.

The questionnaire assessed the dress using an adapted scale, allowing evaluation of how well it fits, considering 13 parameters such as neckline, chest, waist, hips, etc. (Aslam & Davis, 2024; Baytar et al., 2020; Beck & Cri , 2018; Heller, 2019; Kim, 2016; Miell, 2018). The assessment was conducted using a Likert scale.

Sections of the Questionnaire

The assessment of “clothing fit” (14 questions). A 5-point scale was utilized, with response options describing the parameter based on perception: “excessively loose, short, tight” or “perfectly fitted, length,” as well as “excessively loose, long, wide.”

✎ **Assessment of Product Impression of 10 Questions.** A 7-point Likert scale was employed with three main

dimensions: visual perception, tactile perception, and self-perception during try-on. Five additional parameters were defined: perception of style, texture, color, compatibility with other items, and overall body appearance.

✎ **Assessment of Sensations During AR Try-On of 5 Questions.** A 7-point Likert scale was utilized for statements such as: “I can easily visualize the actual dress using augmented reality,” “Augmented reality provides me with an experience comparable to physically trying on clothing in a regular store,” or “Augmented reality allows me to interact with the clothing as if I were trying it on in person.”

The overall impression of the dress and intention to purchase using AR consisted of 3 questions. A 7-point Likert scale was employed for statements like “I want to buy this item.”

✎ **Analysis and Software Utilization :** A one-way repeated measures analysis was employed to collect data under the following conditions: (a) participants tried on clothing using AR technology, and (b) participants tried on the selected clothing in reality.

The statistical software SPSS was utilized to test the proposed hypotheses. Mean values of variables for the dataset were compared in the study using paired sample *t*-tests. Multivariate analysis of variance, or MANOVA, was utilized to examine how the factorial variables in the formulated hypotheses influenced the response variables.

✎ **Reliability Values of the Scales :** The metrics and reliability indicators of the model are summarized in Table 2.

Table 2. Model's Metrics and Reliability Indicators

Metrics	AR		Real-life try-ons	
	Mean (Standard Deviation)	Cronbach's α	Mean (Standard Deviation)	Cronbach's α
1. Product Impression:				
Style	5.08 (1.39)	N/A	5.68 (1.35)	N/A
Fabric texture	3.75 (1.88)	N/A	5.72 (1.22)	N/A
Color perception	4.81 (1.52)	N/A	5.18 (1.60)	N/A
Combinability with other elements	5.24 (1.52)	N/A	5.68 (1.25)	N/A
Details	4.41 (1.39)	N/A	5.35 (1.40)	N/A
Perception of try-on	2.53 (1.82)	N/A	5.92 (1.11)	N/A
Tactile sensations	2.79 (1.89)	N/A	6.00 (.97)	N/A
Body fit	4.18 (1.69)	N/A	5.38 (1.61)	N/A
Comfortability	3.40 (2.03)	N/A	5.89 (1.12)	N/A
Overall body appearance	4.65 (1.68)	N/A	5.11 (1.73)	N/A
2. A sense of presence	3.68 (1.23)	0.86		
3. Attitude towards the product	5.23 (1.00)	0.92	5.58 (1.12)	0.94
4. Intention to purchase the product	4.29 (1.68)	0.94	4.76 (1.73)	0.94

Ten individuals from the experimental group were involved in testing the original tests. Cronbach's alpha coefficient (0.82) was used to assess internal consistency.

Period and Research Sample

The study was conducted from January 1 to October 20, 2021, and involved a sample from Moscow, Russia, due to the necessity of personal contact and the presence of offline stores of the brand that provided the opportunity to use AR technology. Invitations to participate in the experiment were distributed through social networks. A total of 250 invitations were sent out, of which 184 people responded. Female participants aged 20 to 30 were selected for the experiment, as women are more frequently engaged in clothing purchases, and the chosen age group has more experience in online shopping and skills in using technology. They easily adapt to new technological solutions, such as AR. Subsequently, potential participants underwent a preliminary screening process (based on at least one year of online shopping experience and access to the stores of the brand selected for the experiment), reducing the sample size to 128 individuals. Incomplete questionnaires were also discarded, and several participants had to be excluded because the required size was unavailable in the store inventory. Ninety-one questionnaires were retained for analysis. The participants' average age was 25.8 years ($SD = 6.11$).

Analysis and Results

Verification of Research Question 1

The study's first phase assessed the hypothesis that AR technology in clothing try-ons can provide a view of the garment (size, fit, and product appearance) that can be compared to real physical try-ons in a shop (RQ1). Table 3 presents the best-fitting size distribution for the selected clothing items when participants tried them on through AR and real-life try-ons.

No statistically significant difference was found between AR and real-life dress try-ons. Therefore, the results indicate that a positive answer was obtained for RQ1. The product's general impression of conformity to its actual measurements was accurate. AR technology in virtual fitting rooms of online fashion brand shops will allow customers to be more confident in the chosen size of a wardrobe item. Fashion manufacturers will experience positive implications as a result of the management decision to introduce the use of AR technology. Brands have an opportunity to minimize the percentage of possible returns due to size discrepancies and reduce logistics costs when they can send back ordered clothing at the seller's expense. Next, I analyzed the specific fit parameters of the clothing item in question to assess how they matched. Clothing design parameters were compared in AR and real-life try-ons (Table 4).

Table 3. The Results of the Stimulus (Dress) Size Distribution in AR and Real-Life Try-Ons

		Extra Small	Small	Medium	Large	Extra Large	Extra Extra Large
The most	Extra Small	12	0	0	0	0	0
suitable	Small	3	28	0	0	0	0
size for you	Medium	0	4	25	4	0	0
	Large	0	0	2	6	0	0
	Extra Large	0	0	0	0	3	2
	Extra Extra Large	0	0	0	0	0	2

Table 4. How Dress Parameters Match During AR and Real-Life Try-Ons

Compliance Assessment Parameter	Dress fit during real-life try-ons Mean (<i>M</i>) (Standard Deviation (<i>SD</i>))	Dress Fit During AR try-ons Mean (<i>M</i>) (Standard Deviation (<i>SD</i>))	Mean Change (ΔM) (Standard Deviation) of the Real-Life vs. AR Fit	<i>df</i>	<i>t</i>	AR Dress as Opposed to Physical Dress
Collar fit	2.48 (0.54)	2.50 (0.67)	-0.02 (0.62)	90	-0.56	
Bust fit	2.79 (0.70)	2.50 (0.86)	0.29 (1.00)	89	2.60*	It had a looser fit.
Waist fit	3.04 (0.67)	3.45 (1.00)	-0.41 (0.99)	91	-3.74***	It had a tighter fit.
Belly fit	3.16 (0.58)	3.44 (0.76)	-0.28 (0.86)	88	-2.73**	It had a tighter fit.
Hip fit	2.02 (0.36)	3.43 (0.79)	-0.41 (0.81)	90	-4.81***	It had a tighter fit.
Sleeve armhole	3.36 (0.63)	3.09 (0.91)	0.27 (1.07)	88	1.88	
Shoulder width fit	2.96 (0.61)	2.75 (0.86)	0.21 (0.96)	91	2.20*	It was wider.
Cuff fit	3.23 (0.49)	3.08 (0.78)	0.15 (0.90)	90	1.95	
Overall fit according to body measurements	3.08 (0.45)	3.08 (0.58)	0.00 (0.70)	91	0.00	
Total length of the product	3.29 (0.52)	2.96 (0.74)	0.33 (0.87)	90	3.18**	It was longer.
Sleeve length fit	3.22 (0.63)	2.98 (0.85)	0.24 (0.90)	91	2.70**	It was longer.
Torso length fit	3.15 (0.77)	2.76 (0.73)	0.39 (0.92)	91	3.66***	It was longer.
Skirt length fit	3.12 (0.62)	2.74 (0.69)	0.38 (0.74)	89	5.11***	It was longer.

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

As observed, AR and real-life try-ons match well for most parameters. A good correspondence was found when comparing the overall fit according to body measurements, sleeve cuffs, and sleeve armhole. Especially close to reality was the correspondence of AR try-ons in the parameters of collar fit, shoulder width fit, skirt fit, and sleeve fit. However, it should be noted that there were differences in the product's bust fit and shoulder width fit. Participants rated these as looser during AR try-ons. They also found differences in waist fit and hip fit. Participants felt the product fit tighter in these areas during AR try-ons. The identified differences related to how the participants felt the length of the item, the sleeve length fit, the torso length fit, and the skirt length fit.

Thus, for RQ1, the overall impression of product size is consistent, but the hypothesis is only partially confirmed for specific parameters and their consistency between AR and real-life try-ons. It can be stated that AR technology in the context of virtual demand can be beneficial to fashion brands, simplifying and improving clothing selection (for example, determining the fit of collars, shoulders, and sleeves is important for both women's and men's shirts, coats, and blouses). At the same time, the overall fit of the garment is crucial, as customers may not focus on specific fit details but form their impression based on the overall fit (as for trousers, skirts, or coats). Thus, AR technologies can be useful for both fashion brands specializing in everyday wardrobe items and for complex designer clothing solutions, as they allow understanding and visualizing how each item of

Table 5. The Comparison of Product Characteristics During AR and Real-Life Try-Ons

Characteristic Evaluation Parameter	Mean change (ΔM) (Standard Deviation) of the real-life vs. AR fit	Standard Deviation (SD)	df	t
Style choice	0.62	1.71	91	3.28**
Fabric texture	1.99	2.13	90	8.66***
Color choice	0.39	1.91	90	1.10
General harmony of details	0.46	1.43	90	3.02**
Dress details	0.98	1.62	91	5.48***
Tactile (touch) sensations on the body	3.32	2.19	91	14.28***
Product's weight felt on the body	3.19	2.03	89	14.38***
The fit is exactly as expected	1.14	1.86	90	5.86***
Comfortable feelings	2.55	2.15	89	10.77***
Feelings of how the dress looks on the body	0.44	2.11	90	2.08*

Note. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

clothing will fit the buyer's body. The next step was to measure the dress characteristics that participants identified during AR and real-life try-ons (Table 5).

Thus, the tactile sensations of wearing a dress in real-life settings were found to be higher than expected when compared to those imagined during AR try-ons. Participants also rated other characteristics higher when physically touching the clothing item than AR try-ons. These characteristics included the style choice, the fabric texture, overall harmony of dress details, individual product details, the product's tactile sensation, the product's weight felt on the body, the fit being exactly as expected, comfort, and the feelings of how the dress looks on the body. One characteristic – color choice – showed almost no significant differences when compared during AR and real-life try-ons; participants perceived it as almost identical.

Thus, it can be concluded that the findings partially support the formulated research question (RQ1). The experiment demonstrated a general alignment in product impression but partial confirmation regarding specific characteristics and their correspondence between AR and real fittings. However, fashion brands will gain clear advantages in attracting customers by implementing the option of trying on clothing in AR. The interpretation of the result regarding the user's perception of product color is positive. It can be assumed that the three-dimensional (3D) representation of the garment on a virtual avatar allows the buyer to more accurately assess the color scheme and make a more informed decision. This suggests that if customers perceive the product positively during AR fitting and proceed to purchase it, meeting or exceeding their expectations will further increase the likelihood of them keeping the purchased clothing.

To test the research question that AR technology in clothing try-ons can provide the same effect to the customer as real try-ons in a physical shop in forming attitudes toward a piece of clothing and intention to purchase it (RQ2), a paired sample t -test was used (Table 2). Notably, the overall attitude toward the dress was rated highly during the AR and real-life try-ons. The experimental participants' attitude toward the dress was rated as moderately positive. However, the attitude became even more positive when the dress was tried on in real life compared to AR try-ons. The study revealed that participants demonstrated a higher purchase intention when trying on a dress in real life compared to the AR try-ons.

Testing Research Question 2

Hence, the experimental conditions did not support the formulated RQ2 when tested. Nevertheless, one can also consider this result as an argument in favor of applying AR technology in online shops that specialize in selling fashion goods. In general, the researchers observed that consumers reacted more positively to the product when they physically tried on the selected stimulus (the dress) for the experiment. However, the overall attitude toward the product was also positive when customers tried it on their avatars. The participants expressed a higher intention to purchase when they physically contacted the product, which may suggest a lower probability of subsequent returns when ordering online.

Testing Research Question 3

The research question that with lower self-perception during AR, try-ons will have lower attitudes toward the clothing item and purchase intentions than participants with high self-perception (RQ3) was tested by distributing participants into two groups after processing the questionnaire results. The mean (M), which became the separator for the groups of participants, was determined to be 3.70. Thus, those who demonstrated self-perception in AR above this score were categorized as the high-level group (39 participants), and the rest (48 participants) were categorized as the low-level group. Using a MANOVA, it was possible to conclude that the 39 participants who demonstrated high levels of self-perception during AR try-ons had higher positive attitudes toward the AR dress than participants who showed low levels. When testing purchase intention during AR try-ons, similar results were obtained for the low and the high self-perception groups.

Thus, the study confirmed the formulated RQ3 under experimental conditions. The results affirm the potential integration of AR fitting into online sales strategies. When a website visitor identifies with an avatar, the fitting process resembles more closely an in-store visit. It is anticipated that the age group selected for the study exhibits higher levels of self-perception in AR, thus rendering the application of the technology more relevant for youth-oriented fashion brands. Manufacturers targeting all age segments should prioritize the development of user-friendly guidance systems to facilitate avatar control. A positive experience will incentivize return visits in the future. Therefore, AR can serve as an additional tool in the online sales strategies of fashion corporations and act as a catalyst for purchase decisions in the evolving virtualized market.

Discussion

Thus, the study determines the feasibility of AR technology to generate accurate and lifelike representations of a product's fit and performance. The study also unveils whether utilizing virtual technology to try on a product can elicit a positive emotional response from a visitor to a website and generate a desire to complete a purchase. The study's primary findings complement and extend prior research on consumer perception of fashion items in virtual reality (Heller, 2019). Earlier studies indicate that customers may receive incorrect sizes, necessitating exchanges or refunds (Fu et al., 2020). This study corroborates that AR reduces the risk of such errors. It demonstrates that virtual fittings are nearly as accurate as in-person fittings in physical stores, although there have been greater doubts on this matter previously (Grunkowski & Martinez, 2022).

Additionally, attention is drawn to the assertion that AR can alleviate consumers' concerns about receiving a product in real life that significantly differs from the image. Parida et al. (2019) previously demonstrated that online shoppers typically perceive a lack of correspondence between the visual and real physical appearance of clothing. This negative belief may lead to higher rates of clothing returns compared to other products. AR enhances the perception of clothing items, making them more tangible (Santos et al., 2020), and provides some consumers with additional enjoyment and responsiveness (Beck & Crié, 2018).

The researchers obtain partial confirmation that AR technology helps assess how an item will fit the body and generally correspond to its features. This refutes prior works where participants formed a complete perception of an item's fit using 3D and 2D technologies (Yim et al., 2017). The study strengthens the theoretical basis of how self-perception evolves in AR (Kim, 2016), demonstrating that virtual fittings can enhance it, thereby activating the intention to make a purchase.

The examination of the influence of innovative technologies in the business strategies of fashion brands under different economic conditions and the demand of local consumers for innovations is also of interest. For instance, a study on the impact of virtual clothing try-ons on the purchasing motivation of women in Saudi Arabia demonstrates that perception factors in AR positively correlate with the size and quality of purchases (Al Hilal, 2023). The fast fashion effect as a factor in purchasing behavior in Kazakhstan renders innovative approaches in online sales of fashionable clothing less relevant (Dayana & Quan, 2018). The experience of Georgia and Ukraine (Pentina et al., 2018) indicates that global brands currently do not see the potential for transferring innovative online product presentation solutions to these countries. However, e-commerce is becoming increasingly influential in Eastern Europe, the Caucasus, Asia, the Middle East, and Africa, prompting fashion industry brands to inform local customers about applications enabling virtual clothing try-ons (McKinsey & Company, 2021).

Conclusion

The findings indicate that AR facilitates alignment with customers' overall impressions of the product. However, the correspondence between AR and physical fitting is only partially confirmed. Almost all aspects of the garment, such as its fit, style choice, and tactile sensations, are evaluated more accurately in real-life situations. Evaluation of the garment's color during AR and physical fittings shows nearly identical results. It is concluded that real fittings lead to a more positive attitude toward the clothing and an increased intention to purchase among customers. Undoubtedly, consumers do not experience the same feelings and confidence when making a purchase decision when they are first exposed to AR fittings compared to visiting a fitting room. The importance of self-perception is demonstrated during virtual fittings in shaping attitudes toward fashion products and purchase intentions. Participants who demonstrate a high level of self-perception during AR fittings form attitudes toward the product and purchase intentions that closely resemble those formed during real-life fittings.

Implications

Theoretical Implications

The theoretical contribution of the study lies in further advancing the “stimulus-organism-response” model for the conditions that AR shapes in online sales. The research has contributed to developing approaches to identifying factors determining customers' perceptions of augmented and physical reality. Additionally, particular attention has been drawn to consumer behavior, especially concerning their intention to make purchases in the AR environment.

Managerial Implications

The practical outcome of the study comprises experimental data that will facilitate leveraging the advantages of AR in online sales. The integration of AR will lead to a reduction in product returns, as customers will perceive the expectation – reality gap as much smaller. The positive correlation with reality during AR fittings suggests that it

will help increase loyalty to online shopping. Another advantage of AR-based visualization strategies is that brands offering such experiences will profit when a customer is unable to visit a physical store. Consequently, AR solutions for online sales have become a potential means of enhancing customer loyalty by contributing to the formation of purchase intentions.

Limitations of the Study and Scope for Further Research

A limitation of the study is its narrow focus on a specific age group and gender when forming the sample. However, this does not simplify the experiment, as women typically exhibit a higher degree of selectivity and demand in clothing choices. Nevertheless, these limitations do not significantly impact the quality of the experiment, as they do not hinder the assessment of the potential effect of integrating AR into online sales. One potential area for future research is the evaluation of gender differences in how they perceive AR shopping. It would also be worthwhile to conduct assessments among different age groups. Comparing the perception of AR fittings between older and less experienced shoppers may lead to intriguing conclusions. As a further research direction, exploring the ease or difficulty of perceiving different wardrobe items during AR and real fittings by comparing assessment and perception results could be investigated.

Author's Contribution

Dr. Gleb Karpushkin conceived the idea and developed qualitative and quantitative designs to undertake the empirical study. He extracted research papers with high repute, filtered these based on keywords, and generated concepts and codes relevant to the study design. He verified the analytical methods and supervised the study. The interviews were conducted by him, some in colloquial language and some in English.

Conflict of Interest

The author certifies that he has no affiliations with or involvement in any organization or entity with any financial interest or non-financial interest in the subject matter or materials discussed in this manuscript.

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