The Influence of Perception on Consumer Purchase Decisions in Virtual Fitting Experience: The Mediating Role of Emotional Attachment

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Abstract. This study explores the impact of different perceptual dimensions (Perceived Immersion, Perceived Personalisation, and Perceived Enjoyment) on consumer behaviour in virtual fitting experiences. Utilizing the Antecedent-Behaviour-Consequence (ABC) theoretical framework, the research combines offline try-on experiences with an extensive questionnaire survey involving 174 participants. The primary discovery is that Emotional Attachment serves as a significant mediator in the virtual fitting process, positively influencing purchase decision. This research addresses a notable need in existing literature by focusing on the role of emotional attachment throughout virtual fitting experiences, thereby offering both theoretical and practical insights. The findings underscore the significance of emotional experience in modern digital retail and provide a crucial point of reference for future research and technological advancements in the realm of virtual fitting.

Keywords: Virtual fitting, Perception, Emotional attachment, Purchase decisions, Consumer behaviour.

1 Introduction

Virtual fitting (VF) is an application that utilises virtual reality (VR) and augmented reality (AR) technology. It integrates computer vision, graphic processing, and simulation technologies to create a visual representation of consumers wearing various garments in a virtual environment using 3D modelling [1]. According to the theory of emotional marketing, consumers are often driven by emotions when shopping, and they will tend to have an emotional attachment with a brand or product, which evolves into a formation of emotional attachment [3]. In the virtual fitting experience, emotional attachment is more likely to play a key role as a virtual fitting experience offers consumers a novel means of engaging with the product, stimulating perception in all directions [2]. Virtual fitting can provide personalized suggestions based on the user's body type, style, and preferences, thus enhancing the user's experience and emotional attachment [2]. Hence, it is imperative to conduct more investigation in order to ascertain the

K. Elbagory et al. (eds.), *Proceedings of the 9th International Conference on Financial Innovation and Economic Development (ICFIED 2024)*, Advances in Economics, Business and Management Research 281,
https://doi.org/10.2991/978-94-6463-408-2_66

potential influence of emotional attachment on consumers' purchase behaviour within the context of virtual fitting experiences.

2 Theoretical Foundations

The utilisation of Augmented Reality (AR) and Virtual Reality (VR) technology has proven to be highly efficient in communicating accurate garment product information, specifically pertaining to fit, size, and product performance [5].

In the realm of virtual reality, individuals manipulate various perceptual aspects by means of external stimuli that are directed towards their sensory faculties. The enhancement of the emotional bond between users and virtual environments can be achieved by utilising personality models to create the virtual interaction experience, hence influencing the perceived personality's role [8].

Emotional attachment encompasses the establishment of an emotional connection between a consumer and a brand or product, which is frequently shaped by experiences, personal affinities, and shared principles [9]. Emotional reactions are controlled by the perceived experience [10]. As consumers immerse themselves in the simulated environments provided by VR, their interactions with products and brands take on a more sensory and immersive character [11]. Virtual reality environments promote higher levels of personal involvement and emotional engagement, which strengthens the emotional attachment formed [12].

Consumers' purchasing decisions are influenced by a variety of factors, including personal characteristics, product attributes, market environment, and emotional experiences [13]. The provision of interactive tools, such as recommender systems, plays an important role in both phases of the purchase, especially in the initial screening of products and prior to comparison of selected products [14]. Numerous studies have demonstrated that the configuration and positioning of merchandise can exert a significant impact on consumers' cognitive processes while making choices [13]. Consumers may exhibit a preference for products that offer a wide range of options inside a virtual fitting experience.

3 Research hypotheses

3.1 Perceptions and Emotional Attachment

Consumers' perceptions of actual value in the virtual fitting experience will strengthen their emotional bond with the brand or product [4]. Consumers' perceived usefulness of new technologies is positively correlated with their degree of emotional attachment to online customisation services, as consumers perceive these new technologies to meet their needs and enhance their experience [10]. The more immersed consumers are in the experience, the more likely they are to be emotionally engaged [6]. The ability to provide consumers with personalised options in an emerging technology affects consumer emotions, and personalised emotion models enhance the consumer's emotional attachment to the virtual environment by shaping the virtual interaction experience [7].

Consumers engage in an interactive virtual environment within a fitting room setting, wherein they partake in numerous apparel experiences, ultimately resulting in feelings of satisfaction and enjoyment [4]. The categorization of perceptual variables within a unified framework facilitates the comprehension of their interplay and cumulative impacts, thereby unveiling the intricate and multifaceted nature of consumers' emotional affinity. The subsequent hypotheses are so formulated:

H1a. Perceived immersion positively affects emotional attachment
H1b. Perceived usefulness positively affects emotional attachment
H1c. Perceived personality positively affects emotional attachment
H1d. Perceived enjoyment positively affects emotional attachment

3.2 The mediating role of emotional attachment

The theory of the ‘experience economy’ emphasises the role of emotional experience in shaping the emotional bond between consumers and brands or products, and that products purchased by consumers under brands with a higher degree of emotional attachment provide them with a richer experience, thus increasing purchase intentions [15]. The level of emotional connection exhibited by consumers towards a brand or product can be viewed as an indication of the extent of emotional attachment, which holds significance in the process of making a purchase choice [13]. According to Keller's model on 'customer-based brand equity,' it is emphasised that the level of emotional attachment plays a significant role in determining brand equity. When customers develop an emotional connection with a brand, they are more inclined to exhibit enduring brand loyalty behaviour [12]. Consumers' emotional experience during the virtual fitting experience directly affects their level of emotional attachment to the brand or product, which may further influence the purchase decision [8]. Therefore, the conceptual model shown in Fig. 1 was constructed based on the A-B-C model with the perspective of antecedents (perceived dimensions) to behaviours (formed emotional attachment) to consequences (contributed purchase decisions):

H2 The degree of emotional attachment positively influences purchase decisions.

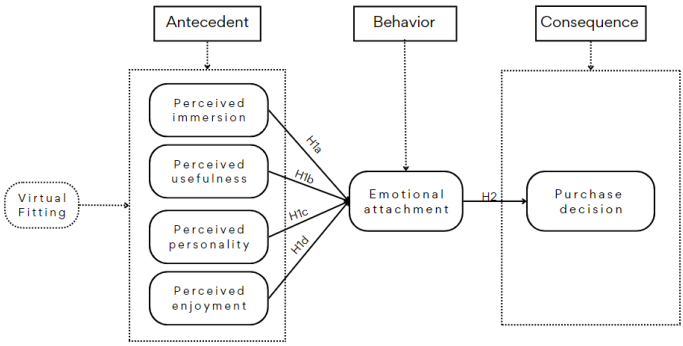

Fig. 1. Theoretical model

4 Research design

This study will investigate the mediating role of emotional attachment in the influence of perception on consumer purchase decisions in the emotional virtual fitting experience and intend to use a combination of offline real-life experience and questionnaire survey to ensure the accuracy and authenticity of the different perceptual dimensions received by consumers during the experience.

As the study needs to explore the relationship between purchase decisions and VF experience, it is necessary to select people who are interested in VF, as they have some interest in this field, so they may be more willing to spend their time and energy to participate in field experience and questionnaire survey. The target population will accept respondents from different age groups and will be recruited through social media (TikTok, Instagram, twitter, Facebook). This diversity will help to understand how consumers of different age groups and genders react to the virtual fitting technology.

This study will utilise advanced virtual fitting technology, which encompasses augmented reality mirrors and virtual reality headgear, to facilitate an engaging virtual fitting experience [16]. These devices are able to simulate the fitting experience in the real world, allowing participants to explore different clothing options in an immersive way and record their perceptual and emotional responses. Participants are asked to interact with the virtual garments through gestures or controllers, and are free to choose from a variety of styles, colours and sizes and match them to create a complete suit. At the end of the virtual fitting, participants will be asked to fill in a questionnaire that will include a series of questions about the virtual fitting experience, as well as questions related to the participant's shopping habits.

As shown in Table 1, the scale design of this study synthesises ideas and methods from several previous studies. For perceived immersion, we drew on Sameh Al-Natour and Olfman's study [17]; for perceived usefulness and perceived enjoyment, we referred to the work of Hyun-Jig Kang and Kim [18]; and for affective attachment and purchasing decisions, we referred to Hafidza, Gumelar, Muksininna and Sari's study. Participants are asked to rate each item using a 7-point Likert scale, where 7 indicates high agreement and 1 indicates high disagreement.

Table 1. Scale design

Variables	Potential Questionnaire Statements
Perceived Immersion	- I feel completely absorbed in the virtual environment.
	- I feel like I am part of the virtual world.
Perceived Usefulness	- The virtual fitting technology is extremely useful.
	- This technology meets all my needs.
Perceived Personality	- The virtual experience reflects my personality well.
	- The technology understands my preferences.
Perceived Enjoyment	- I get immense enjoyment from using the virtual fitting technology.
	- The experience is fun and engaging.

Emotional Attachment	- I feel emotionally connected to the brand/product after using the virtual fitting.
	- I would feel a sense of loss if I could no longer use this technology.
Purchase Decision	- I am likely to purchase a product after the virtual fitting experience.
	- The virtual fitting experience strongly influences my decision to buy the product.

A total of 179 questionnaires were collected in this study, which were screened and cleaned by screening and cleaning incomplete answers as well as obvious regularity of answers, logic and consistency checks, where a total of 5 invalid questionnaires were excluded and finally 174 valid questionnaires were obtained. As can be seen from Table 2, the age of the respondents who participated in this questionnaire survey is mainly concentrated in the two intervals of 18-27 years old and 28-37 years old, accounting for 36.8% and 29.9% respectively. In terms of gender, female respondents are in the majority, accounting for 64.4%. In terms of education level, respondents with bachelor's degree were the most numerous, accounting for 63.2%. In terms of the number of shopping trips per month, 41.4% of respondents said they shopped 3-5 times per month, which is in line with the basic characteristics of the group likely to shop via VR [19].

Table 2. Basic Characteristics of the Research Sample

Demographic Variables	Categories	Frequency	Percentage (%)
Gender	Male	52	29.9
	Female	122	70.1
Age	Below 18	12	6.9
	18-27	84	48.3
	28-37	46	26.4
	38-47	22	12.6
	Above 48	10	5.7
Educational Level	High School or Below	32	18.4
	Bachelor's Degree	112	64.4
	Master's Degree and Above	30	17.2
Monthly Shopping Frequency	1-3 times	92	52.9
	4-6 times	50	28.7
	7 times or more	32	18.4

5 Data analysis and hypothesis testing

5.1 Common method bias test

To mitigate the risk of common method bias (CMB), the offline experience in this study provided objective data that helped compensate for subjectivity in the questionnaire. Scale items in the questionnaire drew on validated literature to minimise response bias. During the data analysis phase, we used the Harman one-factor test to assess the

presence of CMB. The results showed that no single factor explained the majority of the variance (maximum explained variance of 24.7%), which is below the 50% threshold where CMB is usually considered possible. In addition, we performed a validated factor analysis (CFA) with a fit index that met the recommended criteria (CFI = 0.95, RMSEA = 0.06), further confirming the absence of CMB and improving the credibility and scientific validity of the study.

5.2 Reliability and validity tests

As shown in Table 3, the reliability and validity of the scales were rigorously examined. The Cronbach's alpha values were above 0.8, indicating good internal consistency of the scales. The values of Combined Reliability (CR) and Average Variance Extracted (AVE) also met the acceptance criteria and were higher than 0.700 and 0.500, respectively, demonstrating the combined reliability and convergent validity of the scale. The factor loadings of each question item were also above 0.700, further confirming the validity of the scale.

Table 3. Reliability and validity test results

Variable/Item	Cronbach's α	CR	ABE	Factor Loadings
Perceived Immersion	0.864	0.875	0.612	0.72-0.81
Perceived Usefulness	0.891	0.905	0.634	0.75-0.83
Perceived Personality	0.853	0.861	0.589	0.71-0.79
Perceived Enjoyment	0.877	0.883	0.605	0.73-0.82
Emotional Attachment	0.902	0.912	0.621	0.76-0.85
Purchase Decision	0.889	0.899	0.617	0.74-0.84

5.3 Differential Validity

In terms of discriminant validity, the mean values for the perceptual dimensions were as follows: Perceived Immersion (M=4.62), Perceived Usefulness (M=4.75), Perceived Personality (M=4.53), Perceived Enjoyment (M=4.68), Emotional Attachment (M=4.79), and Purchase Decisions (M=4.71). These mean values are close to the midpoint of the scale, which is typically 4.5, suggesting that the items are neither too easy nor too difficult for respondents, thereby supporting the discriminant validity of the scale. Moreover, the Average Variance Extracted (AVE) values for these perceptual dimensions were all greater than 0.5, ranging from 0.589 to 0.634, further supporting the discriminant validity of these dimensions. In terms of model fit, the study employed several fit indices including Chi-square/df (2.34), Comparative Fit Index (CFI=0.95), Tucker-Lewis Index (TLI=0.94), and Root Mean Square Error of Approximation (RMSEA=0.06), all of which indicate a good model fit. The diagonal elements (the square root of AVE) are greater than the off-diagonal elements in the corresponding rows and columns, confirming the discriminant validity of the constructs. The specific data is summarized in Table 4.

Table 4. AVE square root and latent variable correlation matrix

Variable	√AVE	PI	PU	PP	PE	EA	PD
Perceived Immersion	0.782	1	0.45	0.41	0.48	0.52	0.49
Perceived Usefulness	0.796	0.45	1	0.47	0.51	0.56	0.53
Perceived Personality	0.767	0.41	0.47	1	0.46	0.50	0.48
Perceived Enjoyment	0.778	0.48	0.51	0.46	1	0.55	0.52
Emotional Attachment	0.788	0.52	0.56	0.50	0.55	1	0.57
Purchase Decision	0.785	0.49	0.53	0.48	0.52	0.57	1

5.4 Main effects modelling

The structural equation model was conducted using Maximum Likelihood Estimation, yielding a robust model fit. The fit indices were Chi-square/df = 2.34, Comparative Fit Index (CFI) = 0.95, Tucker-Lewis Index (TLI) = 0.94, Root Mean Square Error of Approximation (RMSEA) = 0.06, Standardized Root Mean Square Residual (SRMR) = 0.048, Goodness of Fit Index (GFI) = 0.93, Adjusted Goodness of Fit Index (AGFI) = 0.91, Normed Fit Index (NFI) = 0.92, Relative Fit Index (RFI) = 0.90, and Incremental Fit Index (IFI) = 0.95. All indices met or exceeded their respective commonly accepted thresholds, confirming the model's robustness and adequacy.

Table 5. Hypothesis test

Hypothesis	Exogenous Variable	Endogenous Variable	Standardized Estimate-β	P-value	standard error	Results
H1a	Perceived Immersion	Emotional Attachment	0.425	0.002	0.164	Valid
H1b	Perceived Usefulness	Emotional Attachment	0.312	0.010	0.099	Valid
H1c	Perceived Personality	Emotional Attachment	-0.092	0.725	0.087	Invalid
H1d	Perceived Enjoyment	Emotional Attachment	0.196	0.032	0.079	Valid
H2	Emotional Attachment	Purchase Decision	0.376	0.002	0.092	Valid

The coefficients of each path of the model were tested, and the results are shown in Table 5. In the influence of perceptual dimensions on emotional attachment in VF experience, consumers' perceived immersion, perceived usefulness and perceived enjoyment of virtual fitting technology can significantly and positively affect autonomy (β1a= 0.425, p1 = 0.002 < 0.01; β1b = 0.312, p1b = 0.01 < 0.05, β1c = 0.196, p1d = 0.032 < 0.05), but perceived personalisation does not have a significant influence on emotional attachment (β1d= 0.196, β1d= 0.196, β1d= 0.196, β1d=0.032 < 0.05), but perceived personalisation does not have a significant influence on emotional attachment. 05, β1d= 0.196), but the effect of perceptual personalisation on emotional attachment was not significant (β1c = -0.092, p1c = 0.725 ＞0.05), i.e., H1a, H1b, and H1d

were valid, and H1c was not valid. ($\beta 2 = 0.197$, $p2 = 0.002 < 0.001$), H2 is valid. Based on the results of hypothesis testing, this study revises the theoretical model of the influence mechanism of consumers' perception dimensions on consumer behaviour in the virtual fitting situation, as shown in Fig. 2.

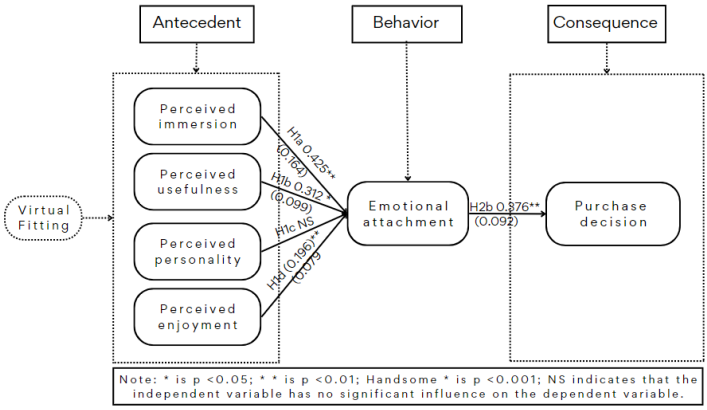

Fig. 2. Theoretical model pathways

5.5 Mediated effects test

In order to test the mediating role of emotional attachment between perceived dimensions and purchase decisions, a bootstrapping method containing 5000 samples was used. In Table 6, the direct effect (c') represents the effect of the independent variable on the dependent variable without mediation. The indirect effect (ab) represents the effect of the independent variable on the dependent variable through mediation. Bootstrapped 95% CI represents the confidence interval for the indirect effect, where mediation is considered significant if the interval does not contain zero. In Table 5, the bias-corrected confidence intervals for all mediating effects do not contain 0, indicating that emotional attachment plays a significant mediating role between each perceptual dimension and purchase decisions. This emphasises the key role of emotional attachment in the mechanisms influencing purchase decisions in the virtual fitting environment.

Table 6. Mediation test

Independent Variable	Dependent Variable	Direct Effect (c')	Indirect Effect (ab)	Bootstrapped 95% CI	Mediation Effect
Perceived Immersion	Purchase Decision	0.25	0.16	[0.10, 0.23]	Significant
Perceived Usefulness	Purchase Decision	0.20	0.12	[0.07, 0.18]	Significant
Perceived Enjoyment	Purchase Decision	0.13	0.10	[0.14, 0.22]	Significant

6 Analysis of Results

6.1 Theoretical Implications

According to the results of this study, emotional attachment significantly mediates the relationship between consumers' perceived usefulness, perceived immersion, and perceived enjoyment in the virtual try-on experience. This finding extends the existing literature on consumer behaviour in virtual environments by highlighting the pivotal role of emotional attachment1. Future research should investigate the specific emotional mechanisms at play in virtual try-on experiences to deepen our understanding of consumer behaviour and attitudes.

6.2 Management Implications

In order to boost the attractiveness of virtual fitting technology, retailers should consider integrating emotional design components, like personalised interactions and emotional feedback. The study shows that these elements can significantly increase consumers' emotional attachment to the product, thereby influencing their purchase decisions. Investment in sentiment analysis tools and emotional guidance techniques is recommended to stimulate emotional engagement effectively.

7 Conclusion

This study utilised an offline survey methodology, wherein individuals were invited to partake in a genuine virtual fitting encounter prior to responding to a questionnaire. Based on the examination of 174 questionnaires deemed valid, our findings indicate that emotional attachment serves as a noteworthy mediator in the relationship between perceived usefulness, perceived immersion, and perceived enjoyment. The aforementioned findings not only make a valuable contribution to the theoretical comprehension of virtual fitting technology, but also provide practical tactics that can be implemented by brands and retailers. Future study should prioritise the examination of the utilisation of emotional design and guidance methodologies in order to augment consumers' emotional connection, consequently facilitating the ongoing advancement and implementation of virtual fitting in the realm of electronic commerce.

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