

Exploring the Effects of Virtual Reality Brand Experiences on Customer Satisfaction: The Influence of Emotional and Cognitive Processes

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Abstract. This study investigates the impact of virtual reality (VR)-based brand experiences on customer satisfaction in the context of a retail store. Drawing on the experience economy framework and the insights from Suh and Prophet (2018), we propose and test a conceptual model that examines the effects of three types of VR experiences (entertainment, aesthetic, and real escape) on customer satisfaction, mediated by hedonic/emotional and utilitarian/cognitive responses. Using a sample of 395 customers from an Egyptian retail store and structural equation modeling (SEM), we find that all three types of VR experiences have significant positive effects on customer satisfaction, and these effects are partially mediated by hedonic/emotional and utilitarian/cognitive responses. The study contributes to the literature by providing a more nuanced understanding of how different types of VR experiences shape customer satisfaction and by highlighting the important role of experiential and cognitive processes in this relationship. The findings offer valuable insights for retailers seeking to leverage VR technology to enhance customer brand experiences and satisfaction.

Keywords: Virtual Reality (VR), Entertainment of VR brand experiences, Aesthetic of VR brand experiences, Real escape, Customer Satisfaction

1. Introduction

In the ever-growing technology and consumer engagement, virtual reality (VR) has appeared as transformative tools across various industries (Hussain & Masood Ali Shaikh, 2023). Augmented reality seamlessly integrates virtual objects with the real world, fostering interaction between the two realms. This technological convergence has become integral for brands seeking to provide immersive and realistic experiences to their customers. Furthermore, AR applications are being employed by companies in both the public and private sectors to enhance marketing strategies and brand awareness (Hussain & Masood Ali Shaikh, 2023).

On the other hand, virtual reality (VR) is characterized by its ability to transport users into computer-simulated environments, whether replicating the real world or constructing imaginative scenarios (El-Nahass, 2021). VR's applications span diverse sectors such as car design, education, construction, and marketing (El-Nahass, 2021). As businesses explore the potential of VR, it presents an opportunity for companies to redefine their interactions with customers through digital reality, creating new avenues for advertising and customer support (El-Nahass, 2021).

Virtual Reality (VR) has emerged as a technology that is blurring the boundaries between the physical and virtual worlds, providing users with a profound immersion sense (Suh, 2018). Immersion, in the context of VR, refers to the degree to which customers' senses are involved by the mediated environment.

Building upon prior studies that have delved into the realms of virtual reality (VR) technologies, this research is grounded in the evolving landscape of consumer experiences and their implications for consumer–brand experience. Though practical Apps of VR technology are growing, specific study on how marketing activities of brand use these new technologies is inadequate. Marketers think brand customer experiences allow them to keep consumers and generate purchases; but, study on the conditions and factors that influence consumers when making decisions is lacking (Zeng et al. 2023). Consequently, the current study seeks to contribute a nuanced understanding of how different types of VR experiences, including entertainment, aesthetics, and education, influence consumer–brand relationships. The exploration of these sub-objectives aligns with the overarching goal of identifying the diverse dimensions of VR experiences that play pivotal roles in shaping meaningful connections between consumers and brands, offering insights with implications for both theory and practical applications in the contemporary marketplace.

The research's main objective is to identify the different forms of virtual reality–based customer brand experience (VR brand experience) to recognize its impact on customer satisfaction. The sub-objective of this study is to investigate :

- The mediating role of the hedonic/emotional response on the impact of entertainment provided by VR-based brand on customer satisfaction.
- The mediating role of the utilitarian/cognitive response on the impact of entertainment provided by VR-based brand on customer satisfaction.
- The mediating role of the hedonic/emotional response on the impact of aesthetic aspects provided by VR-based brand on customer satisfaction.
- The mediating role of the utilitarian/cognitive response on the impact of aesthetic aspects provided by VR-based brand on customer satisfaction.
- The mediating role of the hedonic/emotional response on the impact of real escape/immersion aspects provided by VR-based brand on customer satisfaction.
- The mediating role of the of the utilitarian/cognitive response on the impact of real escape/immersion aspects provided by VR-based brand on customer satisfaction.

2. Literature Review

2.1. Introduction to VR Experiences

Virtual Reality (VR), as conceptualized by Hussain, Z., & Shaikh, M. Z. (2023), provides users with the ability to engage with computer-simulated environments, blurring the boundaries between the real and the imagined. VR offers a powerful means to immerse users in their personalized realities, allowing them to traverse the past, present, and future in a synthesized world. The multifaceted applications of VR, ranging from car design to education, highlight its potential to revolutionize various sectors of the business world (Hussain, Z., & Shaikh, M. Z., 2023). Enterprises are now presented with an opportunity to redefine their interactions with clients through the lens of digital reality. VR, with its capacity to showcase products and services, has become a potent tool for advertising and customer support, offering innovative ways to engage and captivate audiences (Gorlevskaya, L. 2016).

In the context of virtual experience, users navigate product knowledge through a virtual interface, mitigating the challenges rising from the lack of real-world contact and allowing for a realistic encounter with tangible or intangible products. As a result, the VR experience is conceptualized as a customer learning process conducted through a 3D virtual interface, bridging the gap between indirect and real experience. This conceptual overview highlights the crucial role of VR in reshaping consumer learning within the tourism sector, bringing tangible and immersive encounters to the forefront of research and application.

Virtual environment may aid as a marketing channel whereby customers absorb in information search, testing and purchasing. researches have presented that customer dealings with products in the virtual world have the potential to raise product knowledge, purchasing intention that leads to more confident brand attitude (Kim, J. H., Kim, M., Park, M., & Yoo, J., 2021).

2.2. Entertainment-based VR

The powerful visualization and spatial capabilities inherent in VR technologies are steering them beyond the realm of gaming and entertainment towards broader commercial applications (Hariharan et al., 2020). Particularly, in the marketing domain and in a Business-to-Business (B2B) context, the combination of VR and AR unlocks a spectrum of use cases. These encompass industrial production processes for machinery and equipment, facilitating the communication of intricate product configurations, providing a safer representation of heavy materials or dangerous, and supporting corporate sales processing that necessitate robust stakeholder involvement across various teams such as engineering, sales, marketing, and production, both inside and beyond a company's boundaries (Nikoosefat, Z., Jafary, P., & Ahmadi, F., 2023).

2.3. Aesthetic VR Experiences

Aesthetic fascination, a pivotal aspect of the aesthetic experience, involves the audience's profound focus on the subject under consideration. aesthetic encompasses elements marked by heightened attention and arousal within the aesthetic encounter (Tang, Y. M., Lau, Y. Y., & Ho, U. L., 2023). During this state of intense concentration, the audience becomes deeply engrossed in a particular object, leading to a diminished sense of self, a detachment from the surrounding environment, and a distortion of temporal concepts, akin to psychological states such as mental flow (Marković, 2012). The assessment of fascination levels involves metrics that can be categorized into factors related to immersion and presence, examined through both sensory and psychological perspectives.

2.4. Real escape of VR Experiences

Zeng et al. (2023) underscore the positive impact of consumers' experiences with Virtual Reality (VR) in various categories, such as entertainment, aesthetics, education, and real-escape scenarios, on their overall brand experiences. Additionally, the study highlights the pivotal role of customer-brand

relationships in influencing satisfaction and subsequently shaping purchase intentions. The findings emphasize the interconnectedness between VR/AR-based brand experiences and the cultivation of strong customer-brand relationships. Significantly, Zeng et al. (2023) delves into the moderating influence of perceived brand authenticity in the context of different experiential categories. It reveals that brand authenticity plays a vital role in shaping customer-brand relationship when individuals engage in aesthetic, entertainment, and real-escape experiences. Notably, the impact of these experiences on the establishment of customer-brand relationships varies between groups perceiving brand authenticity as low and high. The study establishes an interaction effect, indicating that brand authenticity moderates the relationship between VR experiences and consumer-brand engagement.

2.5. Understanding Brand Experience in Marketing

Customer brand experience implies to “the internal customer reactions (e.g., feelings, cognition, and sensations) and behavioral reactions aroused by brand-related inducements that are role of a brand’s identity, packaging, and communications” (Brakus, 2009). Brand experience are theoretically and practically differentiated from emotional constructs, such as brand involvement and brand attachment, because the actual sensations, cognitions replies are more than Virtual stores for customer brand experience only emotional promises (Schmitt, 2010). brand experience can positively influence customer satisfaction (Schmitt, 2000). Brand experience is practically distinct from other customer-focused perceptions including brand involvement, brand attachment, and consumer enjoyment (Altun, D., 2019).

The concept of customer brand experience transcends mere interactions with products or services; it is a holistic construct encompassing cognitive, emotional, and behavioral answers stimulated by the design, communication, packaging, and environmental features associated with a brand (Zeng et al., 2023). Akifoğlu, U. B. (2016) underscore the competitive advantage of products that embody a spectrum of brand experience types, presenting them as highly differentiated experiential products. To steer clear of price competition and enhance product demand and profitability, the creation of experiential products becomes paramount. The synthesis of distinct brand experiences, harmoniously crafted to evoke memories, not only differentiates a brand but also opens avenues for enhanced marketing opportunities.

Brakus, Schmitt, and Zhang (2009) define brand experience as internal and subjective responses resulting from the amalgamation of brand-related stimuli, delivered through management, marketing, philosophy practices, and rational science. Other researches frame brand experience as the cumulative outcome of user or customer experience. Schmitt accentuates that experiential marketing, enriched with strategic experiences involving the senses, cognition, emotions, relationships, behavior, strengthens brand loyalty and brand value.

2.6. Customer Satisfaction

Lee, D., Lim, D., Kim, K., & Choi, J. (2020) defined it as an emotional response to an experience related to or caused by a specific product or service purchased or a form of shopping or purchase behavior, and Sung, E. C. (2021) defined the selected alternative as the emotional response to the experience caused by these. It was defined as an evaluation of whether the alternative was consistent with prior beliefs, and Bansal, H. S., Mendelson, M. B., & Sharma, B. (2001) defined customer satisfaction as Or, it refers to the degree of favorability regarding the subjective evaluation of the results and experience of purchasing and using the service, and is related to the consumption experience.

Regarding the emotional and emotional responses, satisfaction was defined as reflecting positive emotions and dissatisfaction as reflecting negative emotions. Loureiro, S. M. C. (2019) defined customer satisfaction as a response to customer needs and expectations, resulting in repurchase of products and services. The state of continuous customer trust was defined as customer satisfaction.

3. Hypotheses and Theoretical Background

3.1. Theoretical Background

3.1.1. Hedonic/ Emotional Response Theory

Emotional Intelligence (EI) is a concept that gained widespread recognition and popularization largely due to the efforts of Daniel Goleman, a scientific journalist, author, and psychologist. Emotional Intelligence (EI) gained widespread recognition through the efforts of Daniel Goleman, a psychologist and author. While the term was initially introduced by Peter and Mayer in 1990, Goleman popularized the concept "Emotional Intelligence: Why It Can Matter More Than IQ" in 1995. In addition to EI, the concept of place illusion in virtual reality (VR) simulations has been explored. Place illusion indicates to the customer's sense of presence in a VR environment, influencing emotional responses and enhancing learning experiences (Shirmohammadi, 2024).

3.1.2. Utilitarian/ Cognition Theory

According to cognitive theory, scholars emphasize the significance of behavioral intentions and emotional reactions in understanding the interplay between consumer behavior and cognition. The factors influencing customers' attitudes, such as entertainment, content, and information, are seen as antecedents that trigger emotional responses, subsequently impacting consumer behavior. The understanding of these consequences and determinants is crucial for comprehending how attitudes toward advertising are formed and their subsequent influence on consumption behavior (Kim, M. J., Lee, C. K., & Jung, T. 2020).

3.2. Hypothesis Development

Engagement, brand involvement, and consumer satisfaction are intricately connected elements in the realm of customer brand relationship. When consumers actively attend to specific empirical attributes of a brand, enduring brand experiences become imprinted in the memories, increasingly influencing their attitude toward the brand (Yang & Peterson, 2004). Consequently, the accumulation of experiences through brand consumption serves as the foundational point for the establishment of customer-brand relationships. It is imperative to perceive a brand as an active entity from the customer's perspective, emphasizing the quality, depth, and robustness of consumer relationships to foster genuine connections. In comprehending the dynamics of consumer relations, Pine and Gilmore propose viewing a brand not as a passive object but as an active subject (Aggarwal, 2004). The initial dimension involves the entertainment factor, developed when customers passively recognize an experience, akin to watching a theatrical performance (Zeng et al, 2023). Accordingly, this study hypothesizes that:

- The level of entertainment provided by VR-based brand experiences has a positive correlation with customer satisfaction.
 - H1: The positive impact of entertainment on customer satisfaction is mediated by the hedonic/emotional response.
 - H2: The positive impact of entertainment on customer satisfaction is mediated by the utilitarian/cognitive response.

Pleasurable brands are sought and acquired by customers primarily to derive emotional satisfaction from the sensory characteristics of the brands, encompassing elements such as entertainment, escapism, or relaxation. Advertising plays a pivotal role in marketing, with visual imagery holding significance in the domain of consumer behavior (Watson et al, 2008). The aesthetic nature of a brand is intertwined with consumers' perceptions of beauty, where emotional and cognitive responses to imagery may also encompass sensory reactions. Enjoyable consumption is inherently linked to pleasure, which can manifest as an element of aesthetic appreciation, likely eliciting a hedonic response. It is crucial to distinguish between two activities for comparison: reading a bestselling book and engaging in bungee jumping (Stockdale & Borovicka, 2006). It follows that consumers' aesthetic brand encounters are

anticipated to be closely linked to their satisfaction (Zeng et al, 2023). Accordingly, this study hypothesis that:

- The aesthetic aspects of VR-based brand experiences have a positive correlation with customer satisfaction.
 - H3: The positive impact of aesthetic experiences on customer satisfaction is mediated by the hedonic/emotional response.
 - H4: The positive impact of aesthetic experiences on customer satisfaction is mediated by the utilitarian/cognitive response.

In the assessment of consumer satisfaction concerning travel experiences, findings indicate that contentment is positively influenced by aspects such as entertainment components within reality-escape experiences. However, it is noteworthy that satisfaction is not directly determined by the intrinsic offerings themselves; instead, it is associated with attributes of distinct empirical dimensions, such as entertainment (Reichheld, 2001). In essence, the gratification derived from real-escape experiences is less likely to be solely influenced by destination characteristics or qualities; rather, it is more likely to result from the cumulative psychological effects of the overall experience. When tourists derive enjoyment from a travel destination experience, they have the opportunity to transcend their daily routines, immersing themselves in an alternate world within a different realm of experiential economy (Zeng et al, 2023). In this context, the satisfaction of tourists with the destination experience is achieved. Accordingly, this study hypothesis that:

- The level of real escape experienced through VR-based brand interactions has a positive impact on customer satisfaction.
 - H5: The positive impact of real escape/immersion on customer satisfaction is mediated by the hedonic/emotional response generated during the brand experience.
 - H6: The positive impact of real escape/immersion on customer satisfaction is mediated by the utilitarian/cognitive response elicited during the brand experience.

3.3. Research Model

The research model is shown in Fig1. The Independent Variables are (Real escape /Immersion of brand experiences, Atheistic of brand experiences, Entertainment of brand experiences). The Dependent Variable is (Customer Satisfaction). The Mediator Variables are (Hedonic/ Emotional, Utilitarian/ Cognition).

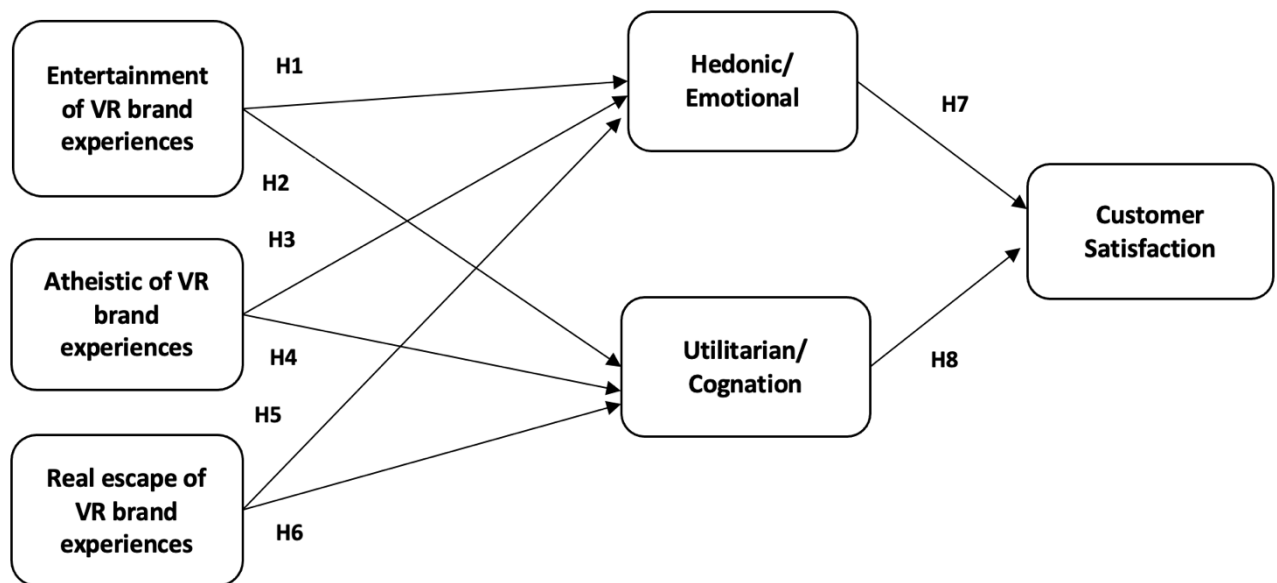


Fig.1: Research Model

4. Research Methodology

4.1. Data Collection and Sampling

In this research, there were collected 395 applicants from the Egyptian population customer using a survey. Virgin Store in Egypt were chosen as an example of a one of the major retail stores of VR (virtual reality) in Egypt to determine any possible variance between brands images. Every applicant was informed that they would be participating in a customer experience survey. Before applicants saw the inducements of the virtual retail store, they were asked a question to confirm that they had carefully read the description. Respondents who provided an inaccurate response were automatically removed from the survey due to their perceived noncompliance with the guidelines.

The ages of the applicants ranged from 20 to 42. Among the applicants, 201 were male, 149 were female. A quantitative method was conducted with a non-probability quota sample for collecting data. After that, applicants received guidelines that demonstrated the virtual tour of the store.

By connecting the provided button, a new tab with the virtual retail store opened in the same window. Once having applicants freely browses, a sequence of questions were provided. The total process took around 15 minutes. The inducements provided as a virtual tour were shaped via 360-degree photos of the actual retail stores in Cairo. To build the study survey, operational variables were gotten. Moreover, item from the survey were extracted from earlier studies. Responses to these survey questions were evaluated using a seven-point Likert scale with values were varying from 1 for “strongly disagree” to 7 for “strongly agree” as shown in Table 1 .

Table 1: Measurements Scale

No	Author/Year	Variable	Scale Items
1	Fam, K. S., Brito, P. Q., Gadekar, M., Richard, J. E., Jargal, U., & Liu, W. (2019)	Entertainment of VR Brand experience	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- I feel the VR of brand experience is interesting. 2- I feel the VR of brand experience is enjoyable. 3- I feel the VR of brand experience is entertaining. 4- I feel the VR of brand experience is pleasing.
2	Streib, H., Klein, C., Keller, B., & Hood, R. (2021)	Atheistic of VR Brand experience	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- The design of the VR of brand experience is appealing. 2- I like the shape of the VR of brand experience. 3- The VR of brand experience can make my senses joyful.
3	Marasco, A., Buonincontri, P., Van Niekerk, M., Orlowski, M., & Okumus, F. (2018)	Real Escape of VR Brand experience	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- I got carried away by the VR of brand experience 2- I felt like I was living in a different time or place with the VR of brand experience let me imagine being someone else I completely escaped from reality. 3- I was so involved in the VR of brand experience I forgot everything
4	Loureiro, S. M. C., Guerreiro, J., & Japutra, A. (2021)	Emotional Experience	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- The VR of brand experience is unique. 2- The VR of brand experience are wonderful 3- The VR of brand experience is memorable.

5	Alyahya, M., & McLean, G. (2022)	Cognitive Experience	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- You are satisfied with the VR of brand experience. 2- Seeing the VR of brand experience meets your expectations. 3- Seeing the VR of brand experience meets your needs.
6	Edler, D., Keil, J., WiedenlÜbbert, T., Sossna, M., Kühne, O., & Dickmann, F. (2019)	Customer Satisfaction	Seven-point Likert scale questions are used ranging from 1= strongly disagree, to 7= strongly agree statements. 1- I am satisfied with The VR of brand experience 2- The VR of brand experience meets all my requirements for a bank 3- The VR of brand experience has met my expectations

5. Data Analysis and Results

In this research, the full descriptive statistics of the research variables was conducted using Python statistical analysis libraries. In addition, inferential statistics were conducted, including reliability, validity tests, confirmatory factor analysis (CFA) and Structural Equation Modeling (SEM) and hypotheses testing using **Smart-PLS software**.

5.1. Descriptive Data

Descriptive data using Python statistical analysis libraries are presented in Table 2. From the table, each dimension's mean is greater than 4, indicating that respondents generally agree on these dimensions. For every variable, the variance inflation factor (VIF) and tolerance were also looked at. VIF need to be 3.3 or less, and tolerances need to be greater than 0.1 (Mandal, 2017). The tolerance for constructs and values of VIF range from 1.350 to 3.225 and 0.271 to 0.845, respectively, according to the results in Table 1. Multi-collinearity is therefore not a problem.

Table 2: Descriptive statistics of main components

Items	Mean	Std. deviation	Tolerance	VIF
Entertainment	5.484	0.994	0.377	2.459
Ent1	5.967	1.036	0.456	1.663
Ent2	5.106	1.401	0.406	1.858
Ent3	5.132	1.399	0.477	1.693
Ent4	5.732	1.172	0.449	1.818
Atheistic	5.688	0.939	0.355	3.231
Ath1	5.800	1.087	0.432	1.853
Ath2	5.706	1.015	0.341	2.049
Ath3	5.557	1.233	0.369	1.522
Real Escape	5.719	0.955	0.688	2.872
RE1	5.724	1.130	0.845	2.001
RE2	5.557	1.196	0.660	1.350
RE3	5.876	1.119	0.339	1.983
Hedonic	5.658	0.949	0.515	2.969
Hed1	5.534	1.169	0.556	1.983
Hed2	5.628	1.088	0.563	2.027
Hed3	5.813	1.102	0.566	1.489

Cognition	5.576	0.999	0.385	3.071
Cog1	5.572	1.127	0.420	1.837
Cog2	5.666	1.117	0.450	1.860
Cog3	5.491	1.253	0.409	1.788
Customer Satisfaction	5.698	1.278	0.676	1.489
CS1	5.603	1.611	0.297	2.844
CS2	5.775	1.340	0.271	3.225
CS3	5.716	1.238	0.278	2.632

5.2. Conduct Exploratory Factor Analysis

The measurement scales were tested for dimensionality, reliability, and validity using exploratory factor analysis (EFA) before assessing the hypothesized relationships. To find the main factors, **XLSTAT software** was used to conduct an exploratory factor analysis (EFA). In order to extract the factors, the principal components PCA analysis was carried out. For each of the 19 factors, factor loading was computed with initials value = 1 as shown in Table 3. The goodness of model fit and Bartlett's test of sphericity and The Kaiser-Meyer-Olkin index were computed. The Bartlett's test of sphericity $\chi^2 = 4300.806$ (df = 171, $p = 0.000$). The Kaiser-Meyer-Olkin (KMO = 0.921).

Table 3: Communalities

	Extraction
Ent1	0.504
Ent2	0.627
Ent3	0.539
Ent4	0.505
Ath1	0.612
Ath2	0.632
Ath3	0.592
RE1	0.108
RE2	0.271
RE3	0.686
Hed1	0.391
Hed2	0.452
Hed3	0.414
Cog1	0.534
Cog2	0.535
Cog3	0.501
CS1	0.780
CS2	0.787
CS3	0.749

5.3. Confirmatory factor Analysis (CFA)

Using all 19 items in the measurement model, **Smart-PLS software** conducted the confirmatory factor analysis. According to the first-order CFA results, the variables have an appropriate factor loading and are suitable for data analysis Table 4.

After evaluation, the model fit indices was deemed to be appropriate based on the CMIN/DF at 3.423, which is acceptable. The RMSEA was 0.062, which is less than the target of 0.08. The SRMR was excellent at 0.06, which is less than the target of 0.08. The CFI is at 0.94 and the GFI at 0.932, which is at the target of greater than 0.80.

Results show that there is an association between independent variables (entertainment, atheistic, real escape, hedonic, cognation) and dependent variable (Customer satisfaction). Some dimensions approached the necessary level, but only the latent dimensions—also referred to as model fit indicators—achieved the acceptable level.

Table 4: Cross-loading criterion

	Atheistic	Cognition	Customer Satisfaction	Entertainment	Hedonic	Real Escape
Ath1	0.848	0.603	0.399	0.607	0.623	0.607
Ath2	0.870	0.578	0.365	0.561	0.590	0.669
Ath3	0.819	0.686	0.343	0.648	0.595	0.666
CS1	0.347	0.385	0.901	0.347	0.466	0.368
CS2	0.373	0.423	0.922	0.381	0.498	0.411
CS3	0.462	0.542	0.918	0.481	0.567	0.466
Cog1	0.663	0.861	0.440	0.580	0.649	0.585
Cog2	0.635	0.860	0.431	0.580	0.644	0.555
Cog3	0.600	0.850	0.413	0.620	0.626	0.585
Ent1	0.604	0.523	0.341	0.778	0.514	0.559
Ent2	0.569	0.589	0.382	0.808	0.440	0.557
Ent3	0.490	0.467	0.331	0.748	0.429	0.483
Ent4	0.600	0.600	0.361	0.829	0.553	0.569
Hed1	0.636	0.715	0.460	0.587	0.869	0.585
Hed2	0.601	0.649	0.543	0.508	0.878	0.563
Hed3	0.578	0.527	0.424	0.466	0.794	0.583
RE1	0.646	0.637	0.400	0.618	0.607	0.885
RE2	0.575	0.419	0.334	0.537	0.501	0.731
RE3	0.694	0.598	0.408	0.564	0.587	0.876

5.4. Reliability and Validity Test

The psychometric qualities were assessed through the utilization of internal consistency and validity. According to Hair et al. (2013) and Harandi et al. (2018), reliability is deemed adequate if the Cronbach's alpha exceeds 0.70. In this study, the Cronbach's alpha coefficient for all dimensions is greater than 0.6, and also, Cronbach's alpha coefficient for the total scale is 0.920 which exceeds the cutoff value of 0.7. This result illustrates the reliability of the assigned constructs, which makes the researcher believes that a questionnaire is a reliable tool for research; the researcher will proceed with the analysis.

Additionally, factor loading estimates and average variance extracted (AVE) were used to evaluate convergent validity, which measures the correspondence between related constructs. Table 5 illustrates that all outer factor loadings of the reflective constructions are significantly higher than the minimum

threshold value of 0.60, and the Cronbach's alpha values are more than 0.70. Convergent validity for each of the constructs is shown by AVE values that are significantly higher than 0.50, demonstrating convergent validity for all the constructs.

According to Lowry and Gaskin (2014), factor loadings between 0.60 and 0.70 are regarded as good, and loadings above 0.70 as very good. Hence, the factor loadings fall inside the permitted bounds. The cross-loading criterion and the Fornell and Larcker (1981) criterion were computed to evaluate discriminant validity. Table 6 presents the relationships among the latent variables. It shows that there is proven discriminant validity among the constructs because the correlations between the constructions in the major diameter and other constructs are higher than those between other constructs.

Table 5: Construct Validity

Construct	Items	Outer Loading	AVE	Cronbach's alpha (α)
Entertainment	Ent1	0.778	0.626	0.765
	Ent2	0.808		
	Ent3	0.748		
	Ent4	0.829		
Atheistic	Ath1	0.848	0.716	0.824
	Ath2	0.870		
	Ath3	0.819		
Real Escape	RE1	0.885	0.695	0.722
	RE2	0.731		
	RE3	0.876		
Hedonic	Hed1	0.869	0.719	0.728
	Hed2	0.878		
	Hed3	0.794		
Cognition	Cog1	0.861	0.735	0.818
	Cog2	0.860		
	Cog3	0.850		
Customer Satisfaction	CS1	0.901	0.835	0.895
	CS2	0.922		
	CS3	0.918		

Table 6: Discriminant validity - Fornell -Larcker criterion

	Atheistic	Cognition	Customer Satisfaction	Entertainment	Hedonic	Real Escape
Atheistic	0.846					
Cognition	0.739	0.857				
Customer Satisfaction	0.437	0.499	0.914			
Entertainment	0.718	0.692	0.447	0.791		
Hedonic	0.714	0.746	0.563	0.615	0.848	
Real Escape	0.766	0.671	0.458	0.687	0.680	0.834

Another method to evaluate the discriminant validity is the Heterotrait-monotrait ratio (HTMT). As shown in Table 7, the Heterotrait-monotrait ratio values are less than the threshold 0.9 thus,

discriminant validity has been established between two reflectively measured constructs (Henseler, J., Ringle, C. M., and Sarstedt, M. 2015).

Table 7: Discriminant validity - Heterotrait-monotrait ratio (HTMT)

	HTMT
Cognition <-> Atheistic	0.823
Customer Satisfaction <-> Atheistic	0.507
Customer Satisfaction <-> Cognition	0.572
Entertainment <-> Atheistic	0.860
Entertainment <-> Cognition	0.850
Entertainment <-> Customer Satisfaction	0.518
Hedonic <-> Atheistic	0.879
Hedonic <-> Cognition	0.844
Hedonic <-> Customer Satisfaction	0.654
Hedonic <-> Entertainment	0.761
Real Escape <-> Atheistic	0.845
Real Escape <-> Cognition	0.829
Real Escape <-> Customer Satisfaction	0.540
Real Escape <-> Entertainment	0.869
Real Escape <-> Hedonic	0.860

5.5. PLS-SEM Model Assessment

In our study, the R^2 and Q^2 values were acquired. The Q^2 value indicates the predictive relevance of the model, whilst the magnitude of R^2 values is a measure of prediction accuracy. Q^2 values for a reflecting endogenous concept in SEM models that are greater than zero suggest that the route model is predictively relevant for that specific construct (Hair et al., 2013).

For Hedonic variable (R^2 is 0.560 and Q^2 predict is 0.551). For Cognition variable (R^2 is 0.609 and Q^2 predict is 0.601). For Customer Satisfaction variable (R^2 is 0.331 and Q^2 predict is 0.231). Although, R^2 customer satisfaction was less than 50%, McGuirk and Driscoll (1995) contend that models that were specified with low R^2 values might still be acceptable, whereas a model that was not properly defined could have a high R^2 value, which is in reality unsuitable. As a result, the R^2 associated with a given model shouldn't always be very large. A high R^2 number does not imply that the model is accurate. Since we are dealing with the variable of human behaviors and fitness indexes confirm the structural model, there is no concern about R^2 and Q^2 .

We also computed the f-square to obtain the effect size. The f^2 on the constructs and their inference are shown in Table 8. According to Davari A, Rezazadeh (2016), The value of the effect size ≥ 0.02 is considered small; ≥ 0.15 is considered medium; ≥ 0.35 is considered Large.

The Bootstrapping approach was employed to obtain the significance of the path coefficients. Two-tailed test was used with 5,000 samples, sig. level = 5% at 95% confidence intervals. As shown in Figure 2, all hypotheses were confirmed. The proposed causal paths were computed in order to evaluate the structural links depicted in the model. The results are shown in Table 9 and state that the experience from the lenses of VR positively affect customer satisfaction. All hypothesis were supported.

Table 8: Inference of the Effect Size

	f-square	Inference
Atheistic -> Cognition	0.147	Small to medium effect
Atheistic -> Hedonic	0.128	Small to medium effect
Cognition -> Customer Satisfaction	0.021	Small to medium effect
Entertainment -> Cognition	0.094	Small to medium effect
Entertainment -> Hedonic	0.022	Small to medium effect
Hedonic -> Customer Satisfaction	0.122	Small to medium effect
Real Escape -> Cognition	0.024	Small to medium effect
Real Escape -> Hedonic	0.066	Small to medium effect

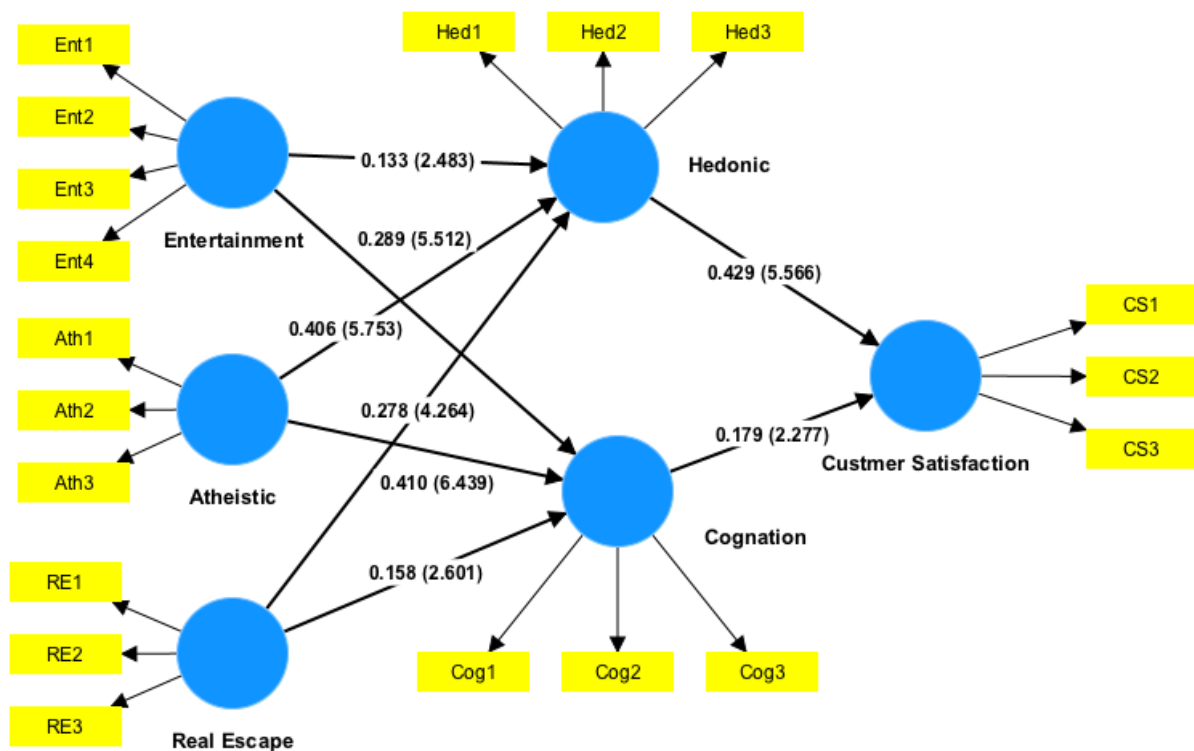


Fig. 2: PLS-SEM Structural Model

Table 9: Path Analysis Results

Hypothesis	Path	Path coefficients	t -statistics	Decision
H1	Entertainment → Cognition	0.289	5.512	Supported
H2	Entertainment → Hedonic	0.133	2.483	Supported
H3	Atheistic → Cognition	0.410	6.439	Supported
H4	Atheistic → Hedonic	0.406	5.753	Supported
H5	Real Escape → Cognition	0.158	2.601	Supported
H6	Real Escape → Hedonic	0.278	4.264	Supported

H7	Hedonic → Customer Satisfaction	0.429	5.566	Supported
H8	Cognition → Customer Satisfaction	0.179	2.277	Supported

Picon et al. (2014) recommended researchers use the bootstrapping approach to test the mediation effect. In the analysis of the mediator role, an analysis of 5,000 samples should be performed for the mediator at 95% confidence intervals. In Table 10, we analyze the specific indirect effects per mediator variable. In Table 11, we analyze the total indirect effect for the total mediation via both mediators (Hedonic and Cognition). From both tables, results show that for each construct, the indirect effect is significant, as a result the total effect is also significant. Thus, show complementary partial mediation.

Table 10: Specific Indirect Effects

	Specific indirect effects	t -statistics
Entertainment → Hedonic → Customer Satisfaction	0.057	2.088
Entertainment → Cognition → Customer Satisfaction	0.052	1.966
Real Escape → Cognition → Customer Satisfaction	0.028	1.649
Atheistic → Hedonic → Customer Satisfaction	0.174	4.143
Real Escape → Hedonic → Customer Satisfaction	0.119	3.348
Atheistic → Cognition → Customer Satisfaction	0.073	2.200

Table 11: Total Indirect Effects

	Total indirect effects	t -statistics
Atheistic → Customer Satisfaction	0.247	5.731
Entertainment → Customer Satisfaction	0.109	3.480
Real Escape → Customer Satisfaction	0.147	3.879

6. Discussion and Conclusions

6.1. Discussion of findings

This study provides valuable insights into the impact of VR-based brand experiences on customer satisfaction in the context of a retail store. The findings suggest that all three types of VR experiences (entertainment, aesthetic, and real escape) have significant positive effects on customer satisfaction, and these effects are partially mediated by hedonic/emotional and utilitarian/cognitive responses. The study contributes to the literature by providing a more comprehensive understanding of how different types of VR experiences shape customer satisfaction and by highlighting the important role of experiential and cognitive processes in this relationship.

The findings have important implications for retailers seeking to leverage VR technology to enhance customer brand experiences and satisfaction. Retailers should design VR experiences that are entertaining, aesthetically pleasing, and emotionally engaging to create a sense of escapism and immersion for customers.

They should also ensure that the VR experiences provide relevant and useful information about the products and services to enhance customers' cognitive evaluations and purchase intentions. However, the study has some limitations that should be acknowledged. The cross-sectional design limits the ability to make causal inferences, and the focus on a single retail store in Egypt may limit the

generalizability of the findings to other contexts and cultures. Future research could use longitudinal designs to examine the long-term effects of VR experiences on customer satisfaction and loyalty, and cross-cultural studies could explore how cultural differences may moderate the relationships between VR experiences and customer outcomes.

6.2. Managerial Implications

While VR is a new channel of marketing, some businesses are constrained to evaluate and track the influence of VR-enabled campaigns. Brand managers can use the theoretical model for VR brand marketing. The model can aid to assess the present situation. Brands that are experimenting with various kinds of VR experience will rapidly get an overview of the performance of diversified VR brand, which can support to produce alignment across divisions and simplify visions into how the campaign helps the key aims of stakeholders. Simultaneously, various VR brand experiences in the same category can be evaluated.

This research provides substantial suggestions for the business. First, conventional retailers store who are facing a decrease in the retailers store's visitors can aid from our outcomes by integrating more experiential customer-oriented content into brand communication (Becerra, et al., 2023). Providing behavioral and sensory retail store brand customer experiences to customers can improve promote visits. To construct positive brand customer experience through the virtual customer experience of a physical retail store, the roles of cognitive and emotional customer experiences are critical. Emphasizing on a brand-related narrative is estimated to induce the intellectual and emotional aspects of customer experience, and thus improve brand customer equity. Third, this research further explains the applicability of virtual reality communicating media as an interactive communication tool. Presenting a memorable virtual customer tour will rise brand customer experience and finally add consumer satisfaction.

6.3. Limitations and Future Research

This paper similarly has limitations. First, the inducements from virtual customer tours only contain visual customer information. Genuinely, stores have multisensory attributes such as fragrance or music. Providing a consistent brand customer experience between the real and virtual world (Kim, J. H., 2023), and providing deep information to expand the practicality of the virtual customer experience is important. Future research should further explain on the customer experience of a virtual visit of physical stores by involving multisensory facts to clarify how the influences of brand customer experiences are improved. Second, this research is one of the little trials to study the three brand customer experience variables and therefore has inadequate theoretical confirmation to construct confirmatory hypotheses. Future research may examine how retail store brand customer experience can aid reinforce the brand-customer relationship and support effectiveness for retailers in the omnichannel retailing era.

In future research, it is expected that these aspects will be studied. In this research, the lack of ability to select different products lines was also a limitation. VR- and Sustainability VR-based brand experiences change by products lines. This factor should also be considered in subsequent researches.

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