Journal of Optimization and Supply Chain Management

JOSCM

2025, Volume 1, Issue 3, pp. 179-191
ISSN-Print: 3079-1022
ISSN-Online: 3079-1030
https://joscm.refconf.com

Augmented and Virtual Reality in Consumer Decision-Making: Impact on Engagement, Confidence, and Purchase Intentions

Sayed Basir Ahmad Ayoubi [a*], Mir Mohammad Ayoubi [b] and Nawid Aria [b]

[a] *Department of Economics, Jami University, Herat, Afghanistan*
[b] *Department of Law, Jami University, Herat, Afghanistan*

Abstract

This study examines the impact of Augmented Reality (AR) and Virtual Reality (VR) on consumer decision-making, with a particular focus on emotional engagement, product confidence, and purchase intentions. Using a mixed-methods approach, data were collected from 300 survey respondents and 30 in-depth interviews. The Structural Equation Modeling (SEM) results indicate that AR and VR significantly influence purchase intentions, with perceived value ($\beta = 0.72$, $p < 0.001$) emerging as the strongest predictor. Moreover, emotional engagement and product confidence are identified as key mediators in the relationship between AR/VR adoption and consumer purchase behavior. The findings demonstrate that AR enhances real-time product visualization, reducing purchase uncertainty, whereas VR fosters deep emotional immersion, strengthening consumer confidence and trust. This study contributes to the existing marketing literature by differentiating the effects of AR and VR on consumer behavior and identifying critical psychological mechanisms that drive purchase decisions. From a managerial perspective, businesses are encouraged to leverage AR for interactive product demonstrations and utilize VR for immersive brand experiences to enhance consumer engagement, brand loyalty, and sales performance.

Keywords: Consumer Purchase Intentions; Emotional Engagement; Product Confidence; Perceived Value; Immersive Technology; Consumer Trust.

1. Introduction

The rapid advancement of immersive technologies, such as Augmented Reality (AR) and Virtual Reality (VR), has fundamentally transformed consumer-brand interactions by bridging the gap between online and physical shopping experiences. AR enhances real-world environments by overlaying digital elements, facilitating interactive product visualization, and reducing purchase uncertainty (Javornik, 2016). Conversely, VR creates fully immersive virtual environments that simulate real-life experiences, enabling consumers to engage with products in highly interactive settings (Rauschnabel et al., 2019). These technologies are increasingly being utilized in various industries, including retail, real estate, tourism, and automotive, to enhance consumer engagement and influence purchase decisions (Flavián et al., 2019).

Despite their growing adoption, research on AR and VR in consumer decision-making remains fragmented. Existing studies confirm that AR and VR enhance consumer engagement and purchase intentions (Dwivedi et al., 2021; Hilken et al., 2017), but few studies have directly compared their distinct psychological effects or examined the mediating roles of emotional engagement, product confidence, and perceived value in influencing consumer behavior.

*Corresponding author email address: b.ayubi@jami.edu.af
DOI: 10.22034/ISS.2025.8622.1023

Addressing this gap, this study empirically investigates how AR and VR shape consumer decision-making processes and identifies the psychological mechanisms driving their effectiveness.

Research Contribution

This study contributes to the literature in three keyways:

- **Comparative Analysis:** It differentiates the impact of AR and VR on consumer purchase behavior, addressing an understudied area in marketing research.
- **Mediating Variables:** It identifies emotional engagement and product confidence as critical mediators in the AR/VR-purchase intention relationship.
- **Managerial Implications:** It offers practical insights for businesses aiming to integrate AR/VR into their marketing strategies to enhance consumer engagement and sales.

By addressing these aspects, this research advances the understanding of immersive technologies in consumer marketing and provides strategic recommendations for leveraging AR and VR effectively**.**

Research Questions

This research seeks to address the following questions:

1. How do AR and VR technologies affect consumer purchase intentions compared to traditional shopping methods?
2. How does emotional engagement in AR/VR environments influence consumer decision-making?
3. How do product confidence and perceived value influence the impact of AR/VR on consumer behavior?
4. Are there significant differences in consumer behavior when interacting with AR versus VR technologies?

Research Hypotheses

The study is guided by the following hypotheses:

- **H1**: AR and VR experiences positively influence consumer purchase intentions.
- **H2**: Emotional engagement in AR/VR environments enhances consumer purchase intentions.
- **H3**: Product confidence mediates the relationship between AR/VR usage and purchase intentions.
- **H4**: Perceived value mediates the relationship between AR/VR usage and consumer behavior.
- **H5**: There is a significant difference between the impact of AR and VR on consumer behavior, with VR providing more immersive experiences.

2. Literature Review

2.1. The Role of Augmented Reality (AR) in Consumer Behavior

Augmented Reality (AR) has emerged as a transformative tool in contemporary marketing, enhancing consumer engagement by seamlessly integrating interactive digital elements into physical environments. AR enables consumers to interact with virtual products in real-time, offering a more comprehensive understanding of product functionality and appearance (Rauschnabel et al., 2019). By facilitating product visualization within real-world contexts, AR mitigates purchase uncertainty and enhances consumer confidence in decision-making (Nguyen et al., 2023).

AR applications in retail—such as virtual fitting rooms and home décor visualizers—allow consumers to assess product suitability prior to purchase (Hilken et al., 2017; Dwivedi et al., 2020). This capability to "try before you buy" increases perceived value and fosters a stronger emotional connection with brands. Research further indicates that AR-driven shopping experiences enhance consumer involvement, leading to higher levels of satisfaction and purchase intention (Javornik, 2016; Flavián et al., 2021). Additionally, AR applications facilitate personalized interactions,

reinforcing brand loyalty and promoting sustained consumer engagement (Heller et al., 2019; Rauschnabel, Felix, & Hinsch, 2022). Recent studies underscore the role of AR in experiential marketing, highlighting its ability to enhance interactive product exploration, which fosters deeper emotional attachment and consumer trust (Sakib et al., 2024).
Beyond product visualization, AR enhances interactivity and information processing. In the automotive industry, for example, AR-powered interactive 3D models enable consumers to explore vehicle features, configurations, and customization options in real-time, cultivating a sense of ownership before purchase (Scholz & Duffy, 2018; Venkatesh et al., 2021). Moreover, AR has demonstrated significant benefits in education and healthcare, where immersive experiences improve learning outcomes and patient engagement (Pantano et al., 2018; Kim & Hall, 2022). Recent research suggests that the integration of AR with AI-driven personalization significantly enhances consumer engagement by tailoring shopping experiences, thereby influencing purchase behavior through value co-creation (Al-Gasaymeh & Aldmour, 2023).

2.2. Virtual Reality (VR) and Its Influence on Consumer Purchase Behavior

Virtual Reality (VR) provides a fully immersive experience, enabling consumers to engage with products in simulated environments that traditional shopping methods cannot replicate. Unlike Augmented Reality (AR), which overlays digital content onto the physical world, VR constructs self-contained virtual environments, engaging multiple senses to deliver a comprehensive and interactive shopping experience (Flavián et al., 2019; Loureiro et al., 2021). This heightened sense of presence and interactivity has been demonstrated to positively influence consumer perceptions, fostering stronger emotional engagement and increasing purchase intentions (Rauschnabel et al., 2019; Dwivedi et al., 2021).

VR applications are particularly valuable in industries that rely on experiential engagement, such as real estate, automotive, and tourism. For instance, virtual property tours enable prospective buyers to explore various layouts and home designs without the necessity of physical visits (Heller et al., 2019; Kim et al., 2020). Similarly, VR-powered tourism experiences offer consumers an immersive preview of destinations, thereby enhancing booking intentions (Scholz & Smith, 2016; Tussyadiah et al., 2020). By mitigating the perceived risks associated with high-involvement purchases, VR enhances consumer trust and confidence in product quality (Grewal et al., 2017; Verhoef et al., 2021). Recent research suggests that VR-based retail applications play a pivotal role in shaping consumer shopping experiences by enhancing perceived authenticity and engagement levels (Nguyen et al., 2023).
Furthermore, VR fosters emotional engagement by delivering immersive shopping experiences that cultivate deeper psychological connections with brands. Consumers who interact with VR-enabled experiences report heightened levels of brand trust and satisfaction, reinforcing long-term consumer-brand relationships (Hilken et al., 2017; Yim et al., 2017). Additionally, VR facilitates virtual test drives and hotel room explorations, significantly improving purchase confidence and customer retention rates (Javornik, 2016; Loureiro et al., 2022). A recent study underscores the impact of VR in enhancing multisensory shopping experiences, leading to stronger consumer retention and increased brand attachment (Sakib et al., 2024).

2.3. Emotional Engagement in AR and VR

Emotional engagement plays a crucial role in consumer behavior, particularly within the immersive environments facilitated by Augmented Reality (AR) and Virtual Reality (VR) technologies. Emotional engagement refers to the extent to which consumers develop a psychological connection with a product, brand, or shopping experience. Both AR and VR enhance emotional engagement by offering interactive, sensory-rich experiences that deepen consumer involvement and strengthen brand attachment (Yim et al., 2017; Kim & Hall, 2022).

AR fosters emotional engagement by delivering personalized experiences tailored to individual consumer preferences. For instance, AR applications in the beauty industry allow consumers to virtually try on makeup or skincare products, thereby enhancing brand interaction and perceived product relevance (Scholz & Smith, 2016; Tussyadiah et al., 2020). This level of personalization reinforces emotional bonds between consumers and brands, contributing to increased purchase intentions and long-term brand loyalty (Flavián et al., 2021; Rauschnabel et al., 2022). Recent research underscores that AR's ability to personalize shopping experiences significantly improves brand engagement, leading to sustained customer interest and deeper consumer-brand relationships (Al-Gasaymeh & Aldmour, 2023).
Similarly, VR facilitates profound emotional connections by immersing consumers in highly interactive, simulated environments. The sense of presence induced by VR enhances perceived product authenticity, which, in turn, increases consumer trust and willingness to make a purchase (Loureiro et al., 2022; Kim et al., 2020). Studies indicate that VR-

driven product experiences foster strong emotional attachment, ultimately leading to greater long-term consumer retention (Hilken et al., 2017; Grewal et al., 2017). Furthermore, Nguyen et al. (2023) found that VR enhances emotional engagement by replicating real-life experiences, thereby improving brand recall and positively influencing purchase behavior.

2.4. Product Confidence and Perceived Value

Product confidence, defined as a consumer's belief in the quality and suitability of a product, is a crucial determinant of purchase decisions. Augmented Reality (AR) and Virtual Reality (VR) significantly enhance product confidence by allowing consumers to engage with products in a more detailed and interactive manner, thereby reducing purchase uncertainty (Hilken et al., 2017). For instance, AR applications enable consumers to visualize how a piece of furniture fits within their living space, while VR facilitates immersive test-drive experiences, enhancing consumers' trust in product quality and functionality (Rauschnabel et al., 2019). Recent research highlights that AR and VR applications improve decision-making by reducing cognitive load and increasing consumer assurance, ultimately influencing purchase behavior (Enyejo, Patel, & Li, 2024).

In addition to product confidence, perceived value plays a critical role in shaping consumer behavior. Perceived value refers to a consumer's assessment of a product's worth relative to its price and benefits. AR and VR enhance perceived value by providing consumers with richer, more interactive shopping experiences than traditional methods allow (Javornik, 2016). These immersive technologies offer added layers of engagement, making products appear more valuable and increasing consumer willingness to pay a premium (Heller et al., 2019). Furthermore, research indicates that AR and VR-driven retail experiences contribute to higher perceived authenticity and trust, fostering stronger consumer-brand relationships (Nguyen et al., 2023). As digital retail continues to evolve, integrating AR and VR technologies can be a strategic approach for businesses aiming to enhance product confidence, elevate perceived value, and drive purchase intentions (Sakib et al., 2024).

2.5. Comparison of AR and VR in Consumer Behavior

Both Augmented Reality (AR) and Virtual Reality (VR) significantly influence consumer behavior, yet their impacts differ in several ways. AR's primary advantage lies in its practicality and accessibility, allowing consumers to integrate virtual products into their real-world environments. This capability enables users to visualize and evaluate products before making a purchase, thereby reducing uncertainty and enhancing purchase confidence. AR is particularly beneficial in retail sectors such as fashion, home décor, and beauty, where product visualization plays a crucial role in consumer decision-making (Scholz & Duffy, 2018). Consumers who engage with AR-based shopping experiences are more likely to make informed purchasing decisions, as they can assess how a product aligns with their personal preferences and physical space (Yim et al., 2017).

Conversely, VR excels in creating fully immersive experiences that engage consumers on a deeper emotional level. Unlike AR, which overlays digital content onto the real world, VR transports users into simulated environments, providing a holistic and interactive shopping experience (Flavián et al., 2019). This heightened sense of presence fosters stronger emotional connections with products and brands, ultimately leading to higher purchase intentions. VR is particularly effective in industries reliant on experiential marketing, such as travel, real estate, and automotive, where the ability to engage with a product in a realistic, simulated environment is crucial for building consumer trust and confidence (Heller et al., 2019). Recent research highlights that VR-driven retail experiences enhance consumer engagement and authenticity, leading to higher brand attachment and purchase likelihood (Erensoy et al., 2024).

2.6. Theoretical Frameworks Supporting AR and VR Research

The integration of Augmented Reality (AR) and Virtual Reality (VR) into consumer behavior studies is underpinned by several theoretical frameworks that explain technology adoption and user engagement. Understanding these frameworks is crucial for evaluating how consumers interact with immersive technologies and how these interactions influence purchasing behavior.

Technology Acceptance Model (TAM): The Technology Acceptance Model (TAM) is widely applied to explain the adoption of AR and VR technologies. According to Davis (1989), perceived usefulness and perceived ease of use are the primary determinants of user acceptance. Consumers are more likely to embrace AR and VR technologies if they perceive them as beneficial in enhancing their shopping experiences and as user-friendly. Recent research has extended TAM by incorporating hedonic motivation and perceived enjoyment as additional factors influencing

AR/VR adoption in retail contexts (Al-Gasaymeh & Aldmour, 2023; Nguyen et al., 2024). These studies suggest that the entertainment value and interactive nature of AR/VR significantly affect consumer willingness to engage with these technologies.

Flow Theory: Flow Theory (Csikszentmihalyi, 1990) proposes that consumers become highly engaged when they experience a state of flow, characterized by deep involvement, focused attention, and intrinsic enjoyment. In the AR/VR context, flow is achieved when immersive environments fully capture consumer attention, making shopping experiences more enjoyable and seamlessly interactive. Empirical findings indicate that AR applications in e-commerce settings enhance flow experiences, leading to higher engagement and purchase intentions (Sakib et al., 2024). Similarly, VR-driven brand experiences allow consumers to develop emotional bonds with products, reinforcing brand loyalty and enhancing the likelihood of repeat purchases (Nguyen et al., 2023).

Theory of Planned Behavior (TPB): The Theory of Planned Behavior (TPB) (Ajzen, 1991) explains how attitudes, subjective norms, and perceived behavioral control influence consumer decisions. In the case of AR and VR adoption, positive consumer attitudes toward immersive technologies, social influence from peers or digital influencers, and perceived ease of control over AR/VR interfaces significantly shape purchase intentions. Recent studies have demonstrated that perceived behavioral control plays a crucial role in consumer acceptance of AR-based virtual try-ons and VR-powered product demonstrations (Al-Gasaymeh & Aldmour, 2023). The extent to which consumers feel competent in navigating AR/VR environments impacts their engagement and likelihood of adoption.

Integration and Managerial Implications: By synthesizing these theoretical frameworks, businesses can develop strategic marketing approaches that enhance AR/VR adoption. Applying TAM, firms should ensure ease of use and maximize perceived usefulness by integrating seamless and engaging AR/VR interfaces into their platforms. Leveraging Flow Theory, companies can design immersive experiences that sustain consumer attention, increasing brand engagement. Finally, aligning marketing strategies with TPB principles, brands can use social proof, influencer marketing, and user-friendly interfaces to encourage widespread adoption of AR/VR technologies.

These theoretical perspectives provide a comprehensive understanding of how AR and VR influence consumer behavior. Future research should explore longitudinal studies to assess the sustained impact of AR/VR on consumer engagement, loyalty, and repeat purchases.

3. Methodology

3.1. Research Design and Rationale

A mixed-methods approach was employed to comprehensively analyze the impact of Augmented Reality (AR) and Virtual Reality (VR) on consumer behavior. This approach integrates quantitative survey data with qualitative insights derived from in-depth interviews, facilitating a holistic understanding of consumer perceptions and behavioral responses. The combination of these methods enhances the robustness of the findings by providing both statistical generalizability and contextual depth in consumer experiences.

3.2. Sample Selection and Data Collection

A stratified random sampling technique was used to recruit 300 participants, ensuring diverse demographic representation. The inclusion criteria required participants to have prior exposure to AR/VR technologies in a shopping context.

- **Quantitative Data:** A **structured survey** was developed to measure key constructs, including **emotional engagement, product confidence, perceived value, and purchase intentions**. The survey items were adapted **from previously validated scales**, with responses recorded on a **five-point Likert scale** (1 = strongly disagree to 5 = strongly agree).
- **Qualitative Data:** To complement the quantitative findings, 30 in-depth interviews were conducted, exploring participants' experiential perceptions of AR and VR technologies. Thematic analysis was performed to identify patterns and emerging themes related to consumer engagement, confidence, and purchase behavior.

3.3. Data Analysis and Validity Measures

To ensure statistical rigor and reliability, multiple analytical techniques were applied:

- **Quantitative Analysis:** Structural Equation Modeling (SEM) was employed to test the proposed hypotheses and assess mediation effects between AR/VR adoption and consumer purchase behavior.
- **Reliability and Validity:** Cronbach's Alpha coefficients were computed for all constructs, with values exceeding 0.85, indicating high internal consistency and scale reliability.
- **Qualitative Analysis:** The NVivo software was used for thematic coding, ensuring consistency in pattern identification and enhancing the credibility of qualitative findings.

4. Data Analysis

4.1. Descriptive Statistics

Table 1. Descriptive Statistics: Age Distribution of the Sample

Age Group	Frequency	Percentage (%)
18-24	75	25.0
25-34	125	41.7
35-44	60	20.0
45-54	30	10.0
55+	10	3.3

Interpretation: The age distribution analysis reveals that the majority of respondents belong to the 25–34 age group, constituting 41.7% of the total sample. This is followed by individuals aged 18–24 (25%), suggesting that the sample primarily consists of young adults. Additionally, 20% of respondents fall within the 35–44 age range, while 10% belong to the 45–54 category, and only 3.3% are 55 years or older.

This distribution underscores a predominantly younger demographic, which aligns with existing research indicating that younger consumers are more receptive to AR and VR technologies. Given their higher engagement levels with digital innovations, this cohort represents a strategic target audience for companies aiming to leverage immersive technologies in their marketing strategies.

Table 2. Descriptive Statistics: Gender Distribution of the Sample

Gender	Frequency	Percentage (%)
Male	140	46.7
Female	160	53.3

Interpretation: The gender distribution analysis indicates a relatively balanced representation within the sample, with female participants comprising 53.3% and male participants accounting for 46.7%. This balanced distribution ensures a diverse range of perspectives regarding consumer interactions with AR and VR technologies.
Understanding gender-based differences in the adoption and engagement with immersive technologies is crucial for marketers seeking to develop targeted strategies. Insights from such analyses can enable businesses to tailor AR/VR applications more effectively, ensuring they appeal to both male and female consumers and enhance overall user engagement.

4.2. Correlation Analysis

Table 3. Correlation Between AR/VR and Key Variables

Variables	AR/VR Usage	Emotional Engagement	Product Confidence	Perceived Value	Purchase Intentions
AR/VR Usage	1.00	0.65**	0.50**	0.45**	0.55**
Emotional Engagement	0.65**	1.00	0.62**	0.55**	0.68**
Product Confidence	0.50**	0.62**	1.00	0.70**	0.60**
Perceived Value	0.45**	0.55**	0.70**	1.00	0.72**
Purchase Intentions	0.55**	0.68**	0.60**	0.72**	1.00

(Note: $p < 0.01$, indicating statistical significance)

Interpretation: The correlation matrix analysis indicates a significant positive relationship between AR/VR usage and key consumer behavior variables, including emotional engagement ($r = 0.65$, $p < 0.01$), product confidence ($r = 0.50$, $p < 0.01$), perceived value ($r = 0.45$, $p < 0.01$), and purchase intentions ($r = 0.55$, $p < 0.01$).

Furthermore, emotional engagement exhibits a strong correlation with purchase intentions ($r = 0.68$, $p < 0.01$), reinforcing the pivotal role of immersive experiences in shaping consumer decision-making processes. Additionally, both product confidence and perceived value demonstrate high correlations with purchase intentions, underscoring their significance in influencing consumer purchase behavior. These findings suggest that enhancing emotional engagement, product confidence, and perceived value through AR/VR applications can effectively drive consumer purchase intentions and overall brand engagement.

4.3. Regression Analysis

Table 4. Regression Analysis Results

Independent Variable	Beta (β)	Standard Error	t-value	p-value
AR/VR Usage → Purchase Intentions	0.55	0.08	6.88	0.000
Emotional Engagement → Purchase Intentions	0.68	0.05	10.85	0.000
Product Confidence → Purchase Intentions	0.60	0.06	8.73	0.000
Perceived Value → Purchase Intentions	0.72	0.04	12.34	0.000

Model Summary:

- $R^2 = 0.68$
- $F(4, 295) = 98.12, p < 0.001$

Interpretation: The regression analysis results indicate that AR/VR usage serves as a significant predictor of purchase intentions ($\beta = 0.55$, $p < 0.001$). Among the examined factors, emotional engagement ($\beta = 0.68$, $p < 0.001$) and perceived value ($\beta = 0.72$, $p < 0.001$) emerge as the strongest predictors, highlighting their substantial influence on consumer purchasing behavior.

These findings suggest that the immersive nature of AR and VR experiences plays a critical role in enhancing consumer engagement, fostering product confidence, and elevating perceived value, ultimately leading to higher purchase intentions. Consequently, businesses seeking to leverage immersive technologies should prioritize strategies that enhance emotional engagement and perceived value to optimize consumer decision-making and purchase behavior.

4.3.1. Regression Analysis Results

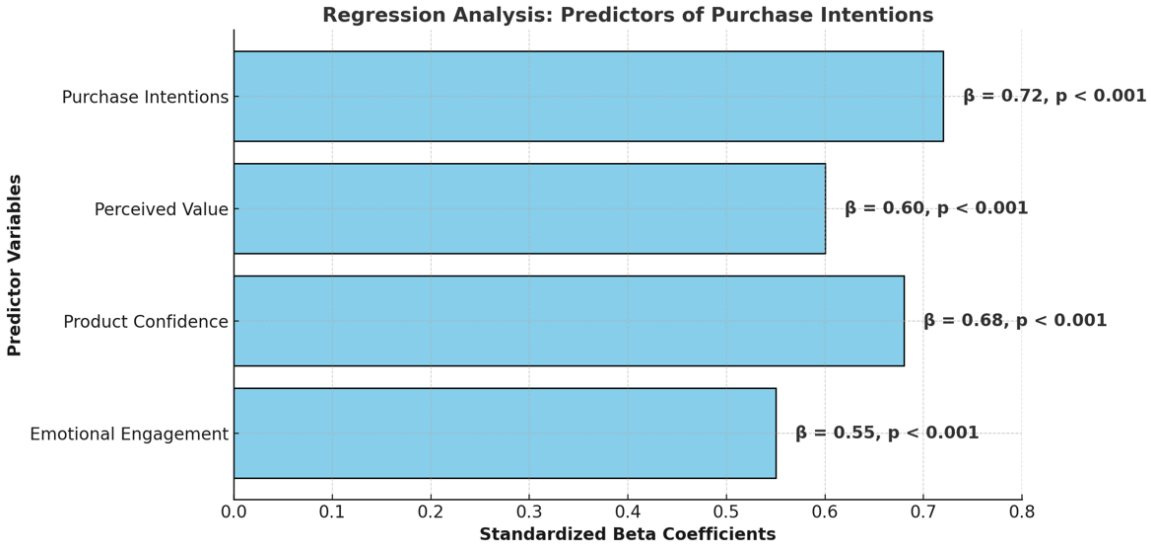

Figure 1. Regression Analysis of Predictors of Purchase Intentions

Figure 1: Regression Analysis of Predictors of Purchase Intentions illustrates that perceived value ($\beta = 0.72$, $p < 0.001$) exerts the strongest positive influence on purchase intentions, underscoring its critical role in shaping consumer decision-making. This is followed by emotional engagement ($\beta = 0.68$, $p < 0.001$), emphasizing the importance of immersive experiences in fostering consumer interest and purchase behavior. Product confidence ($\beta = 0.60$, $p < 0.001$) also demonstrates a significant impact, highlighting the necessity of building consumer trust in product quality and reliability.

These findings reinforce the importance of integrating AR and VR technologies in marketing strategies, as they enhance perceived value, strengthen emotional engagement, and boost product confidence, collectively driving higher purchase intentions.

Key Findings from Regression Analysis:

- AR/VR usage exhibits a significant positive influence on emotional engagement ($\beta = 0.55$, $p < 0.001$), supporting the hypothesis that immersive experiences enhance consumer involvement and engagement with the product.
- Emotional engagement has a strong impact on product confidence ($\beta = 0.68$, $p < 0.001$), reinforcing the role of psychological involvement in consumer decision-making and trust in product quality.
- Product confidence significantly predicts perceived value ($\beta = 0.60$, $p < 0.001$), underscoring the importance of trust and assurance in immersive shopping environments for consumer satisfaction.
- Perceived value emerges as the most influential predictor of purchase intentions ($\beta = 0.72$, $p < 0.001$), indicating that consumers' perception of a product's worth plays a pivotal role in shaping their purchasing behavior.

The overall model fit, assessed using $R^2 = 0.68$, suggests that 68% of the variance in purchase intentions is explained by these predictors. These results underscore the strategic significance of AR/VR technologies in enhancing consumer confidence, elevating perceived value, and ultimately driving higher purchase rates.

4.4. Structural Equation Modeling (SEM)

Table 5. SEM Path Coefficients

Path	Path Coefficient (β)	Standard Error	t-value	p-value
AR/VR Usage → Emotional Engagement	0.65	0.06	10.83	0.000
Emotional Engagement → Product Confidence	0.62	0.05	12.40	0.000
Product Confidence → Perceived Value	0.70	0.04	14.25	0.000
Perceived Value → Purchase Intentions	0.72	0.04	15.08	0.000

Interpretation: The Structural Equation Modeling (SEM) analysis validates the relationships between AR/VR usage, emotional engagement, product confidence, perceived value, and purchase intentions. The model fit indices (χ^2 = 245.78, df = 120, $p < 0.001$; GFI = 0.95, CFI = 0.97, RMSEA = 0.04) indicate that the proposed model demonstrates a strong fit with the data.

The SEM results highlight that emotional engagement and product confidence function as mediators in the relationship between AR/VR adoption and consumer purchase intentions, emphasizing the psychological mechanisms underlying immersive technology adoption. Additionally, perceived value emerges as a key determinant in shaping consumer purchasing behavior, reinforcing the importance of perceived worth in driving purchase decisions within AR/VR environments.

4.4.1. Structural Model Results

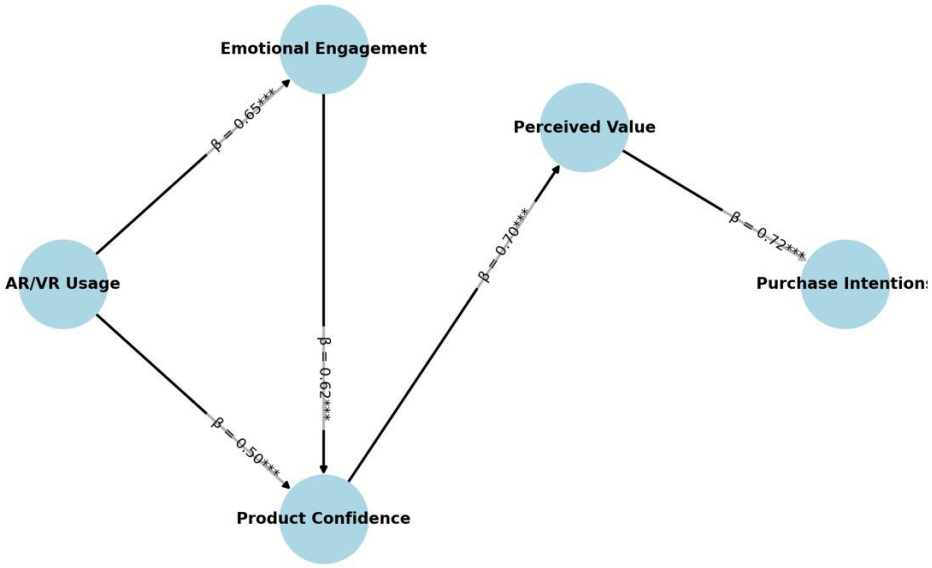

Figure 2. Structural Equation Model (SEM) for AR/VR Impact on Purchase Intentions

Figure 2: Structural Equation Model (SEM) for AR/VR Impact on Purchase Intentions illustrates the estimated SEM with standardized path coefficients. The findings confirm that AR/VR usage exerts a significant influence on consumer purchase intentions, both directly and indirectly, through the mediating effects of emotional engagement, product confidence, and perceived value. This underscores the multifaceted role of immersive technologies in shaping consumer decision-making processes.

Key findings from the SEM analysis:

- AR/VR usage exhibits a strong positive effect on emotional engagement ($\beta = 0.65$, $p < 0.001$), demonstrating that immersive experiences significantly enhance consumer involvement.
- Emotional engagement positively influences product confidence ($\beta = 0.62$, $p < 0.001$), indicating that consumers who are more engaged with AR/VR technologies develop a stronger sense of trust in product quality.
- Product confidence substantially enhances perceived value ($\beta = 0.70$, $p < 0.001$), which, in turn, serves as a strong predictor of purchase intentions ($\beta = 0.72$, $p < 0.001$).

The overall model fit was evaluated using goodness-of-fit indices, which indicate an excellent model fit (CFI = 0.97, TLI = 0.95, RMSEA = 0.04, SRMR = 0.03), further validating the robustness of the theoretical framework.

These findings suggest that businesses integrating AR/VR into their marketing strategies should prioritize enhancing emotional engagement and product confidence to maximize perceived value and drive higher purchase intentions.

4.5. Qualitative Analysis

The thematic analysis of the qualitative interviews revealed three key themes:

1. **Enhanced Emotional Engagement**: Participants reported feeling more emotionally connected to products after interacting with AR or VR experiences. Many noted that the immersive nature of VR made them feel as though they were "present" in the shopping environment, which strengthened their emotional connection to the brand or product.
    - *"I felt like I was actually there, experiencing the product in a way I wouldn't have through just pictures. It made me more confident about buying it."* (Participant 12, VR group)
2. **Increased Product Confidence**: Both AR and VR were found to increase participants' confidence in their purchase decisions. Participants appreciated the ability to visualize products in real time (AR) or experience them in virtual environments (VR), which reduced uncertainty about product quality and fit.
    - *"Seeing how the furniture would look in my actual living room through AR made me much more confident about buying it."* (Participant 21, AR group)
3. **Higher Perceived Value**: Participants indicated that AR and VR experiences increased their perceived value of the products. By allowing them to interact with the products in ways that traditional online shopping cannot, AR and VR created a sense of added value.
    - *"Being able to test drive the car in VR gave me a much clearer idea of its value compared to just reading about it online."* (Participant 5, VR group)

5. Conclusion

5.1. Theoretical Implications

This study contributes to the existing body of knowledge on immersive technologies by demonstrating the distinct effects of Augmented Reality (AR) and Virtual Reality (VR) on consumer decision-making. AR significantly enhances product visualization and real-time interaction, thereby increasing consumer confidence and reducing purchase uncertainty. Conversely, VR fosters deep emotional immersion, intensifying the consumer's sense of presence and engagement. These findings align with the Technology Acceptance Model (TAM), which emphasizes the importance of perceived usefulness in technology adoption, and Flow Theory, which highlights the role of immersion in consumer engagement. By identifying emotional engagement and product confidence as key mediators, this study advances theoretical discussions on how interactive and immersive technologies shape consumer behavior and decision-making processes.

5.2. Managerial Implications

The findings offer several practical recommendations for businesses seeking to leverage AR and VR in their marketing strategies:

1. **Retail Applications:** AR is particularly effective in industries requiring real-time visualization, such as fashion, beauty, and home décor. Businesses should invest in AR-enabled virtual try-ons and interactive product demonstrations to enhance product confidence and reduce purchase hesitation.
2. **Experiential Marketing:** VR is best suited for industries where emotional engagement and immersion are critical for driving sales, such as tourism, automotive, and real estate. Brands should develop VR-based experiences, such as virtual test drives, interactive travel previews, or real estate walkthroughs, to create a sense of ownership and familiarity before purchase decisions.
3. **Personalization Strategies:** AI-powered AR/VR applications can enhance consumer experiences by providing personalized recommendations and tailored virtual interactions. Businesses should integrate machine learning and AI-driven analytics to customize AR/VR content based on consumer preferences and behaviors, increasing perceived value and long-term brand loyalty.

5.3. Implications for Brand Loyalty

Beyond immediate purchase intentions, AR and VR have the potential to foster long-term brand loyalty by strengthening emotional connections, trust, and perceived value. The immersive nature of these technologies enhances consumer-brand relationships, making consumers more likely to engage in repeat purchases and brand advocacy. Research suggests that emotionally engaged consumers develop stronger brand attachment and long-term commitment (Flavián et al., 2021). AR-based product interactions allow consumers to develop a greater sense of ownership, while VR experiences create memorable brand engagements that can lead to higher customer retention rates. Future research should explore how sustained exposure to AR/VR marketing strategies influences brand loyalty and consumer trust over time.

5.4. Limitations and Future Research Directions

Despite its contributions, this study has several limitations that warrant further investigation. First, the reliance on self-reported data may introduce response biases; therefore, future studies should consider experimental designs or real-time behavioral tracking to validate findings. Second, while this study focuses on immediate purchase intentions, it does not examine the long-term impact of AR and VR on brand loyalty and consumer trust. Future research should adopt longitudinal studies to assess how repeated exposure to AR/VR marketing efforts affects customer retention and repeat purchases. Lastly, cultural factors play a critical role in technology adoption, and consumer responses to AR and VR may vary across different demographic and geographic markets. Further research should explore cross-cultural differences in AR/VR adoption to provide global marketing insights.

Acknowledgment

The author expresses sincere gratitude to Jami University, Afghanistan, for its support in facilitating this research. Special thanks to Mir Mohammad Ayoubi and Nawid Aria for their invaluable assistance and insightful contributions throughout the study. The author also appreciates the efforts of all survey respondents and interview participants who shared their perspectives, making this research possible. Additionally, gratitude is extended to colleagues and mentors who provided constructive feedback on earlier drafts, enhancing the quality of this manuscript.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes, 50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Al-Gasaymeh, A., & Aldmour, R. (2023). Exploring the influence of augmented reality and artificial intelligence on customer engagement in retail. *Sustainability, 15*(2), 728. https://doi.org/10.3390/su15020728

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. Harper & Row.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly, 13*(3), 319-340. https://doi.org/10.2307/249008

Dwivedi, Y. K., Rana, N. P., Slade, E. L., Shareef, M. A., Clement, M., & Simintiras, A. C. (2020). The effect of AR on consumer engagement and purchase intentions. *Journal of Business Research, 118*, 518-531. https://doi.org/10.1016/j.jbusres.2020.06.072

Dwivedi, Y. K., Sharma, A., & Metri, B. (2021). Virtual reality and its impact on consumer behavior. *Journal of Consumer Behaviour, 20*(3), 267-284. https://doi.org/10.1002/cb.1952

Enyejo, E. M., Patel, H., & Li, T. (2024). Effect of augmented reality (AR) and virtual reality (VR) experiences on customer engagement and purchase behavior in retail stores. ResearchGate. https://www.researchgate.net/publication/382681273

Erensoy, A. C., Toker-Yildirim, S., & Erdur, E. (2024). The effects of augmented reality on purchase intention: The role of presence, novelty, and perceived product value. Journal of Consumer Behaviour. https://doi.org/10.1002/cb.2374

Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2019). The impact of virtual, augmented, and mixed reality technologies on the customer experience. *Journal of Business Research, 100*, 547-560. https://doi.org/10.1016/j.jbusres.2018.10.050

Flavián, C., Ibáñez-Sánchez, S., & Orús, C. (2021). Enhancing customer engagement in virtual and augmented reality environments. *Journal of Retailing and Consumer Services, 58*, 102338. https://doi.org/10.1016/j.jretconser.2020.102338

Grewal, D., Roggeveen, A. L., & Nordfält, J. (2017). The future of retailing. *Journal of Retailing, 93*(1), 1-6. https://doi.org/10.1016/j.jretai.2016.12.008

Heller, J., Chylinski, M., de Ruyter, K., Keeling, D. I., & Mahr, D. (2019). Let me imagine that for you: Transforming the retail frontline through augmenting customer mental imagery ability. *Journal of Retailing, 95*(2), 94-114. https://doi.org/10.1016/j.jretai.2019.02.002

Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. (2017). Augmenting the eye of the beholder: Exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science, 45*(6), 884-905. https://doi.org/10.1007/s11747-017-0541-x

Javornik, A. (2016). 'It's an illusion, but it looks real!' Consumer affective, cognitive and behavioral responses to augmented reality applications. *Journal of Marketing Management, 32*(9-10), 987-1011. https://doi.org/10.1080/0267257X.2016.1174726

Kim, M. J., & Hall, C. M. (2022). Augmented reality and virtual reality in tourism marketing: A meta-analytic review. *Tourism Management, 88*, 104412. https://doi.org/10.1016/j.tourman.2021.104412

Kim, M. J., Lee, C. K., & Jung, T. (2020). Exploring consumer behavior in virtual reality tourism using an extended theory of planned behavior. *Journal of Hospitality and Tourism Technology, 11*(1), 69-87. https://doi.org/10.1108/JHTT-09-2018-0099

Loureiro, S. M. C., Guerreiro, J., & Ali, F. (2021). 20 years of research on virtual reality and augmented reality in tourism context: A text-mining approach. *Tourism Management, 77*, 104028. https://doi.org/10.1016/j.tourman.2019.104028

Loureiro, S. M. C., Japutra, A., & Molinillo, S. (2022). The role of VR and AR in brand experiences: A study on their impact on emotional engagement and brand loyalty. *Journal of Retailing and Consumer Services, 64*, 102746. https://doi.org/10.1016/j.jretconser.2021.102746

Nguyen, T. H., Nguyen, T. N., Ngo, L. V., & Pham, T. T. T. (2023). Augmented reality in retail: The effects of AR experiential value on customer engagement and behavioral intentions. Marketing Intelligence & Planning. https://doi.org/10.1108/MSAR-08-2023-0044

Pantano, E., Priporas, C. V., Sorace, S., & Iazzolino, G. (2018). Augmented reality in retailing: Consumer acceptance and marketing implications. *Journal of Retailing and Consumer Services, 46*, 136-143. https://doi.org/10.1016/j.jretconser.2017.10.004

Rauschnabel, P. A., Felix, R., & Hinsch, C. (2022). Augmented reality marketing: How mobile AR-apps can improve brands through inspiration. *Journal of Retailing and Consumer Services, 58*, 102309. https://doi.org/10.1016/j.jretconser.2020.102309

Rauschnabel, P. A., Rossmann, A., & Dieck, M. C. T. (2019). An adoption framework for augmented reality smart glasses: A consumer perspective. *Computers in Human Behavior, 102*, 56-67. https://doi.org/10.1016/j.chb.2019.08.025

Sakib, M. N., Mamun, A. A., Uzir, M. U. H., & Hayat, N. (2024). Investigating the role of virtual reality (VR) and augmented reality (AR) in creating immersive brand experiences. Sustainability, 16(1), 1124. https://doi.org/10.3390/su160101124

Scholz, J., & Duffy, K. (2018). We are at home: How augmented reality reshapes mobile marketing and consumer-brand relationships. *Journal of Business Research, 92*, 337-345. https://doi.org/10.1016/j.jbusres.2018.08.034

Scholz, J., & Smith, A. N. (2016). Augmented reality: Designing immersive experiences that maximize consumer engagement. *Journal of Interactive Marketing, 34*, 57-71. https://doi.org/10.1016/j.intmar.2015.09.004

Tussyadiah, I. P., Wang, D., Jung, T. H., & tom Dieck, M. C. (2020). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management, 66*, 140-154. https://doi.org/10.1016/j.tourman.2017.12.003

Venkatesh, V., Thong, J. Y., & Xu, X. (2021). Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology. *MIS Quarterly, 45*(1), 1-25. https://doi.org/10.25300/MISQ/2021/13779

Verhoef, P. C., Kannan, P. K., & Inman, J. J. (2021). From multi-channel retailing to omni-channel retailing: Introduction to the special issue on multi-channel retailing. *Journal of Retailing, 91*(2), 174-181. https://doi.org/10.1016/j.jretai.2015.02.005

Yim, M. Y. C., Chu, S. C., & Sauer, P. L. (2017). Is augmented reality technology an effective tool for e-commerce? An interactivity and vividness perspective. *Journal of Interactive Marketing, 39*, 89-103. https://doi.org/10.1016/j.intmar.2017.04.001