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Factors Influencing Intention to use Augmented Reality for Shopping in United States

Asem Nasser Alnasser[1*], Mohammad Ali Almushaiti[2] and Solaiman Ahmed Almositeer[3]

[1]College of Business Administration, Majmaah University, Saudi Arabia. Email: an.alnasser@mu.edu.sa
[2]School of Business, Suliman Al Rajhi University, Al-Bukayriyah, Qassim Province, Saudi Arabia. Email: 231130138@srcolleges.org
[3]Business School, University of Exeter, United Kingdom. Email: sa843@exeter.ac.uk
*Corresponding Author: an.alnasser@mu.edu.sa

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Abstract

Augmented reality (AR) technology has gained significant attention in the retail sector for its potential to enhance the shopping experience. This cross-sectional quantitative study investigates the factors influencing consumers' intention to adopt AR for shopping, with a focus on the mediating role of self-efficacy. Data were collected via an online survey from 312 individuals residing in the United States who have engaged in online shopping within the past six months. Convenience sampling was employed, and data were analyzed using structural equation modeling. The study found that perceived relative advantage, augmented quality, and innovativeness positively influence consumers' intention to use AR for shopping. Furthermore, self-efficacy emerged as a significant mediator in this relationship, highlighting the importance of consumers' confidence in their ability to utilize AR technology. These findings offer valuable insights for businesses seeking to leverage AR technologies to enhance the retail experience and drive consumer engagement. By strategically addressing these factors, retailers can unlock the transformative potential of AR and position themselves at the forefront of AR-driven retail innovation.

Keywords: augmented reality; online shopping; self-efficacy; retailer

1. Introduction

Augmented reality (AR) integrates computer-generated assets, such as video overlays, graphics, or images, into the physical environment through various devices including smart glasses, desktop computers, and mobile smartphones (Alam et al., 2021; Davis & Aslam, 2024). This technology enables users to interact with both virtual elements and the real world simultaneously, thereby creating a blended experience that enhances their interaction with the physical space. AR technology operates by overlaying digital information onto the real-world environment in real-time, allowing users to perceive and interact with a composite view that merges physical and virtual elements. This integration of virtual content—ranging from complex graphical representations to dynamic digital imagery and sensory simulations—transforms traditional interactions by adding layers of contextual data and immersive experiences. The application of AR extends across various domains, enhancing user engagement through interactive visualizations and augmented experiences. For instance, in educational settings, AR can provide interactive diagrams and simulations, while in retail, it can offer virtual try-ons or product previews. By creating a hybrid interaction model, AR fosters innovative ways to engage with information and surroundings, thereby revolutionizing the way users perceive and interact with their environment (Ng & Ramasamy, 2018). Given AR's significant potential, numerous businesses are adopting this technology to engage with their customers (Nasya et al., 2024). AR allows marketers to promote their products more creatively (Lin & Huang, 2024). For instance, AR can simulate a try-on experience typically

available in physical stores, encouraging online buyers to purchase more products (Kumar et al., 2024). Consumers can test and view products virtually using their smartphone cameras. Many modern retailers in apparel, home goods, eyewear, and cosmetics sectors are utilizing AR technology to market their products (Nawres et al., 2024). AR technology, heralded as a disruptive force within the retail industry, represents a paradigm shift in how consumers engage with products and brands (Mekonnen, 2024). By seamlessly blending digital elements with the physical world, AR offers an immersive and interactive shopping experience that transcends traditional boundaries (Lin & Huang, 2024). This transformative technology holds the promise of revolutionizing the retail landscape, empowering businesses to captivate consumers, drive sales, and foster brand loyalty in unprecedented ways.

The widespread adoption of smart devices, coupled with advancements in gesture recognition and motion capture methodologies, has empowered retailers to deploy cutting-edge solutions that elevate consumer engagement with their products (Daassi & Debbabi, 2022). Beauty tech, which integrates Artificial Intelligence (AI) and Augmented Reality (AR) technologies, is designed to enhance and tailor the customer experience through capabilities such as cosmetic color simulations and individualized recommendations. The advent of Virtual Reality (VR) and AR has had a profound impact on online retail, reshaping consumer purchasing behaviors (Hsu et al., 2021; Wang et al., 2023). While AR's prominence and accessibility have surged recently with the proliferation of smartphones equipped with requisite hardware (Song et al., 2020; Arghashi, 2022), AR applications are being innovatively developed across a range of industries, holding significant potential to fundamentally transform conventional retail and marketing practices (Saprikis et al., 2021). AR functions not only as a technological tool but also as a compelling medium, generating value through enhanced user engagement, operational efficiency, visual appeal, and interactive elements. Consequently, AR technology is on track to substantially redefine shopping and e-commerce experiences globally (Rauschnabel et al., 2022), driving a paradigm shift in e-commerce by augmenting and personalizing the consumer shopping journey. In today's dynamic and increasingly digitalized marketplace, the integration of AR into retail environments has become a strategic imperative for businesses seeking to stay ahead of the curve and meet evolving consumer expectations (Davis & Aslam, 2024; Nasya et al., 2024). From virtual try-on experiences to interactive product demonstrations, AR offers a myriad of possibilities to enhance the shopping journey and elevate the overall customer experience. As such, understanding the factors that influence consumer adoption behavior and intention to use AR for shopping has become paramount for retailers and marketers alike. These factors encompass a spectrum of dimensions, including perceived relative advantage, augmented quality, innovativeness, and self-efficacy, each playing a pivotal role in shaping consumers' attitudes and behaviors towards AR technology in the retail context.

Despite the growing interest and investment in AR applications for retail, there remains a dearth of empirical research examining the intricate mechanisms underlying consumer adoption behavior (Rejeb et al., 2023; Jayaswal & Parida, 2023). This study seeks to address this gap by delving into the nuanced interplay between these factors and their impact on consumers' intention to adopt AR for shopping. This study endeavors to unravel the complex dynamics driving AR adoption and shed light on its transformative potential in redefining the future of retail and consumer experiences. By elucidating these dynamics, businesses can gain valuable insights to inform strategic decision-making and craft targeted marketing strategies aimed at promoting the widespread adoption of AR technologies in the retail sector.

The paper follows a structured approach, beginning with an introduction that outlines the significance of AR in retail and sets the research objectives as per the literature review. The methodology section describes the research design, participant selection, data collection, and analysis methods. Results present the findings on factors influencing AR adoption, while the discussion section interprets these findings and discusses their implications. Finally, the paper concludes by summarizing key findings and their implications for the retail industry's future.

2. Literature Review and Hypotheses Development

2.1. Perceived Relative Advantage

Perceived relative advantage holds significant sway in the adoption of emerging technologies, especially within the realm of AR in retail (Jiang et al., 2021). It delineates the extent to which consumers perceive AR as delivering superior benefits compared to traditional shopping methods. Davis et al. (1989) posited that perceived relative advantage bears resemblance to perceived usefulness and is pivotal in shaping user attitudes. Additionally, Van Slyke et al. (2007) found that perceived relative advantage, as per the innovation diffusion theory, exerts a direct and substantial influence on users' attitudes towards communication technology. AR's capacity to furnish distinctive and enriched shopping encounters, such as virtual try-ons and interactive product showcases, positions it as a more advanced alternative to conventional shopping approaches (Chandra & Kumar, 2018). These advantages encompass heightened decision-making, amplified satisfaction, and a more immersive shopping journey, all contributing to AR's perceived relative advantage. Comparatively, AR shopping applications are favorably perceived by certain consumers over traditional online platforms for their ability to enhance shopping engagement and experience through pre-purchase product simulation or real-world shopping environments (Kim, 2019; Zhang et al., 2019). This facilitates better product assessment and aids in making informed judgments, thereby mitigating issues related to product suitability, such as sizing, color matching, style selection, and makeup coordination.

The perceived relative advantage of AR largely hinges on its capability to provide personalized and immersive experiences (Kowalczuk et al., 2021). By allowing customers to envision products in their own settings or on their bodies, AR significantly elevates the shopping experience and fosters heightened satisfaction levels. Moreover, the accessibility and user-friendliness of AR via smartphones and other smart devices further bolster its perceived relative advantage. As consumers grow more accustomed to these technologies and their benefits, the propensity to adopt AR for shopping endeavors increases. This amalgamation of enhanced user experience, personalized interactions, and the convenience of AR technology buttresses its perceived relative advantage, rendering it an appealing option for both retailers and consumers. Harnessing the perceived relative advantage, retailers can incentivize the adoption of AR technology, thereby catalyzing a transformative shift in the retail landscape and enriching the overall shopping journey for consumers. Hence, the following hypothesis is posited.

H1: Perceived relative advantage influences on self-efficacy.

2.2. Augmented Quality

Augmented quality encompasses the enhancement of product attributes and features through the integration of AR technology. It involves leveraging AR to elevate the perceived quality of products, services, or experiences offered to consumers. Poushneh (2018) proposes that augmented quality in retail necessitates striking a balance between users' control over access to personal information and the quality of augmentation provided. By incorporating AR features, retailers can enrich the shopping experience by offering additional information, interactive elements, or virtual representations of products. This not only enhances consumers' perception of product quality but also provides them with a more immersive and engaging shopping experience (Leonnard et al., 2019). Pantano and Servidio (2012) underscore the potential of immersive technologies like AR in shaping innovative points of sale, highlighting the crucial role of augmented quality in influencing consumer perceptions and behaviors in retail environments. Augmented reality generates personalized output for users, with augmented quality serving as a focal point in this study. This concept, akin to augmentation as discussed by Javornik et al. (2016) and Poushneh (2018), albeit broader, centers on the output quality resulting from interacting with augmented reality. It encompasses the quality of information, mapping, and awareness received by users during AR interactions. The quality of these aspects positively influences user behavior in online shopping contexts (Pantano & Servidio, 2012). When all three facets of augmented quality surpass user expectations, they contribute to enhanced self-efficacy. Thus, the following hypothesis is proposed.

H2: Augmented quality influences on self-efficacy.

2.3. Innovativeness

Innovativeness, defined as an individual's willingness to try new IT, plays a crucial role in technology acceptance studies, indicating a propensity to experiment with new products or concepts. Various e-commerce models integrate the construct of innovativeness, which reflects consumers' readiness to embrace innovation. Future research could explore the influence of users' technological savviness and openness to innovation on AR adoption, as well as how user interactions with AR evolve over time (Javornik, 2016; Han et al., 2021). Personal innovativeness, as an external variable from the consumer perspective, denotes an individual's willingness to adopt innovation. Those with high levels of innovativeness are more likely to accept new technology (Luo et al., 2010). This construct has been employed in numerous studies examining internet and mobile banking adoption (Aldás-Manzano et al., 2009), mobile services usage (Zarmpou et al., 2012), mobile payment (Kim et al., 2010), and wireless internet services (Lu et al., 2005). Given that consumers perceive augmented reality as a cutting-edge innovation, it is plausible to hypothesize a relationship between innovativeness and self-efficacy:

H3: Innovativeness influences self-efficacy.

2.4. Self-efficacy

Self-efficacy refers to an individual's belief in their ability to successfully perform specific tasks or achieve desired outcomes in a given domain. It encompasses confidence in one's capacity to effectively utilize their skills, knowledge, and resources to accomplish goals or overcome challenges. Research suggests that self-efficacy plays a significant role in shaping individuals' attitudes, behaviors, and performance across various contexts, including technology adoption and usage (Bandura, 1997). In the context of AR adoption, self-efficacy may influence users' confidence in their ability to navigate AR applications, interact with virtual content, and derive value from the technology (Alam et al., 2021). Higher levels of self-efficacy are associated with greater motivation, persistence, and engagement, which may lead to more positive experiences with AR and increased likelihood of continued usage (Compeau & Higgins, 1995). Moreover, self-efficacy beliefs can impact individuals' perceptions of their own capabilities to overcome challenges or barriers encountered during AR interactions, thereby influencing their overall satisfaction and success with the technology (Venkatesh et al., 2003). Given the importance of self-efficacy in technology adoption and usage, it is reasonable to hypothesize that:

H4: Self-efficacy influences on intention to use AR for shopping.
H5: Self-efficacy mediates the relationship between perceived relative advantage and intention to use AR for shopping.
H6: Self-efficacy mediates the relationship between augmented quality and intention to use AR for shopping.
H7: Self-efficacy mediates the relationship between innovativeness and intention to use AR for shopping.

Figure 1 depicts the study research model.

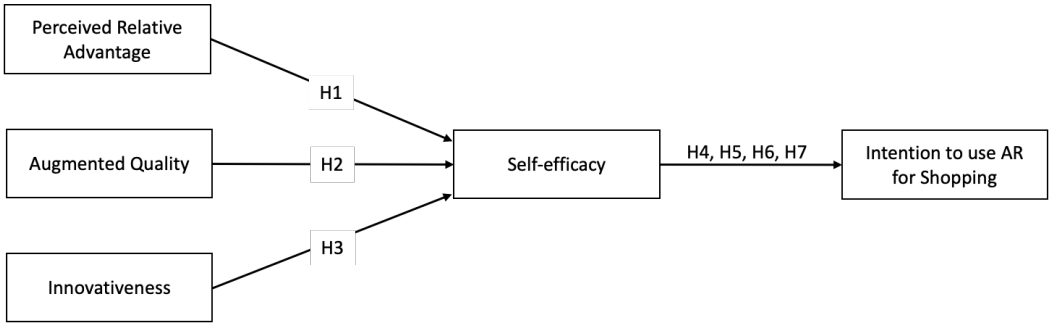

Figure 1. Research Model

3. Methodology

The research adopts a cross-sectional quantitative approach, providing a snapshot of participants' intentions regarding AR technology for shopping purposes. This methodology allows for the examination of relationships between variables at a single point in time, offering valuable insights into consumer behavior within a specific context. The study gathered data from individuals residing in the United States who have engaged in online shopping within the past six months. This criterion ensures that participants possess recent experience with e-commerce platforms, making them suitable candidates for assessing their perceptions and intentions related to AR in the context of shopping. Data collection was conducted through an online survey from March to April 2024, leveraging the convenience and accessibility of digital platforms to reach a wide audience of potential participants. The online survey format enables efficient data collection while minimizing geographical and logistical constraints, thus maximizing the study's reach and diversity of respondents. Convenience sampling was chosen as the sampling technique for its practicality and efficiency in obtaining a diverse pool of participants. Given the accessibility of online surveys, convenience sampling allows for quick and cost-effective data collection from a broad range of individuals who meet the study's criteria. A total of 312 participants were included in the study. This sample size strikes a balance between statistical power and feasibility, ensuring an adequate representation of the target population while maintaining manageable data collection and analysis efforts.

All items were rated on a 7-point Likert scale, with response options ranging from 1 ("strongly disagree") to 7 ("strongly agree"). Perceived relative advantage was measured using five items adapted from Yuen et al. (2018), augmented quality was measured using five items adapted from Poushneh (2018), innovativeness was measured using five items adapted from Voicu et al. (2023), self-efficacy was measured using three items adapted from Chao (2019), and intention to use AR for shopping was measured using seven items adapted from Voicu et al. (2023). These measurement items were selected based on their relevance and established validity and reliability in prior research, enhancing the credibility and rigor of the study's findings.

Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for data analysis. This methodological approach is well-suited for analyzing complex relationships among latent variables, particularly in cases where sample sizes are relatively small (Hair et al., 2019). PLS-SEM allows for the examination of both measurement and structural models, providing robust insights into the interplay between constructs.

4. Results

The survey included 312 respondents with a majority being male (58%) compared to female (42%) as mentioned in Table 1. The age distribution shows a significant concentration in the 26-35 age group, which accounts for 54% of the respondents, followed by 24% in the 18-25 age group, 14% in the 36-45 age group, and 8% above 45 years old. Educationally, the respondents are highly qualified, with 64% holding a Bachelor's degree, 31% having a Master's degree, and 4% with a Higher Secondary School education. Regarding marital status, 48% of the respondents are single, 42% are married, while smaller percentages are divorced (5%), separated (3%), or widowed (3%). This demographic profile illustrates a predominantly young, well-educated, and mostly single or married population.

Table 2 presents measurement model for reliability and validity metrics for five constructs, including perceived relative advantage, augmented quality, innovativeness, self-efficacy, and intention to use AR for shopping. Item loadings for all the constructs above 0.7 threshold. The constructs show strong internal consistency and reliability, as evidenced by Cronbach's alpha values all exceeding 0.7. Perceived relative advantage has a Cronbach's alpha of 0.73, Composite Reliability (CR) of 0.767, and Average Variance Extracted (AVE) of 0.511, indicating acceptable reliability and that over half of the variance is captured by the construct. Augmented quality has a Cronbach's alpha of 0.727, CR of 0.811, and AVE of 0.568, reflecting good reliability and substantial variance capture. Innovativeness shows a Cronbach's alpha of 0.753, CR of 0.833, and AVE of 0.501, suggesting strong reliability and adequate variance capture. Self-efficacy demonstrates good internal

consistency with a Cronbach's alpha of 0.774, CR of 0.82, and a high AVE of 0.603, indicating a significant amount of variance capture. The intention to use AR for shopping construct has the highest reliability metrics with a Cronbach's alpha of 0.789, CR of 0.847, and AVE of 0.643, reflecting strong internal consistency and high variance capture.

Table 1. Respondents' characteristics (n=312).

	Frequency	Percent
Gender		
Male	182	58%
Female	130	42%
Age		
18-25	76	24%
26-35	167	54%
36-45	43	14%
Above 45	26	8%
Education		
Higher Secondary School	13	4%
Bachelor degree	201	64%
Master degree	98	31%
Marital Status		
Single	149	48%
Married	131	42%
Divorced	15	5%
Separated	9	3%
Widow	8	3%

Table 3 presents the discriminant validity among five constructs, following the Fornell-Larcker Criterion. The diagonal values represent the square root of the Average Variance Extracted (AVE) for each construct. Off-diagonal values show the correlation coefficients between pairs of constructs. The square roots of AVE for all constructs exceed the correlation coefficients between them, indicating sufficient discriminant validity. Augmented quality, innovativeness, intention to Use AR for Shopping, perceived relative advantage, and self-efficacy exhibit discriminant validity, with each construct demonstrating a higher correlation with its respective measures than with other constructs. This suggests that each construct captures unique variance distinct from other constructs, supporting the reliability of the measurement model and the distinctiveness of the constructs therein.

Table 4 outlines the direct relationship path coefficients along with relevant statistical metrics and hypothesis outcomes. The analysis reveals significant associations between various constructs. Firstly, perceived relative advantage exhibits a positive and statistically significant relationship with self-efficacy ($\beta = 0.399$, $p = 0.002$), supporting Hypothesis 1. Similarly, augmented quality and innovativeness both positively influence self-efficacy, with coefficients of 0.304 ($p = 0.004$) and 0.622 ($p < 0.001$), respectively, confirming Hypotheses 2 and 3. Furthermore, self-efficacy strongly predicts intention to use AR for shopping ($\beta = 0.754$, $p < 0.001$), as stated in Hypothesis 4. Additionally, the indirect effects of perceived relative advantage, augmented quality, and innovativeness on intention to use AR for shopping through self-efficacy are statistically significant, with respective coefficients of 0.375 ($p = 0.001$), 0.229 ($p = 0.005$), and 0.468 ($p < 0.001$), supporting Hypotheses 5, 6, and 7. These results underscore the critical role of perceived relative advantage, augmented quality, and innovativeness in fostering self-efficacy and subsequent adoption intentions toward augmented reality for shopping purposes.

Figure 2 presents R-square values for the two constructs, intention to use AR for shopping and self-efficacy, indicate the proportion of variance explained by the independent variables in their respective models. For intention to use AR for shopping, the R-square value is 0.568, meaning that 56.8% of the variance in the intention to use AR for shopping can be explained by the independent variables included in the model. Similarly, for self-efficacy, the R-square value is 0.601, indicating that 60.1% of the variance in self-efficacy can be explained by the independent variables in the model. These R-square values suggest that the independent

variables included in the model have a moderate to substantial explanatory power in predicting both self-efficacy and intention to use AR for shopping.

Table 2. Measurement model.

Constructs	Loadings	Cronbach's alpha	Composite reliability	Average variance extracted (AVE)
Perceived Relative Advantage		0.73	0.767	0.511
AR app would be better than traditional product display mode because:				
PRA1: They would improve my online shopping experience	0.72			
PRA2: They would make it easier for me to make a purchase decision	0.764			
PRA3: They would be allowed to complete the process of online shopping more efficiently	0.7			
PRA4: They would be more beneficial to me	0.785			
PRA5: They would be the best way for me to experience online shopping	0.744			
Augmented Quality		0.727	0.811	0.568
AQ1: AR on online shopping app has many features, is very interesting and produces high quality output	0.798			
AQ2: AR is very easy to use	0.721			
AQ3: AR does not require any enhancements other than smartphones, tablets, or laptops	0.712			
AQ4: The ability of AR to adjust with users is very high	0.772			
AQ5: AR can be used anytime and anywhere	0.775			
Innovativeness		0.753	0.833	0.501
INO1: I like to use new technologies	0.795			
INO2: I like learning about new technologies	0.711			
INO3: When I am informed about a new technological product, I try to find the opportunity to experiment with it	0.72			
INO4: Compared to my friends and family, I am usually among the first to try new technologies	0.702			
INO5: I believe that AR technology is very good for e-commerce	0.799			
Self-efficacy		0.774	0.82	0.603
SEF1: I am convinced that I will adopt AR for shopping	0.770			
SEF2: I could figure out a way to implement AR for shopping	0.733			
SEF3: I am confident of using AR if I have never used such a system before	0.825			
Intention to use AR for Shopping		0.789	0.847	0.643
INT1: I intend to continue using AR app in the future	0.882			
INT2: I will always try to use AR app in my daily life	0.782			
INT3: I will keep using AR app as regularly as I do now	0.77			
INT4: I expect to purchase products after using the AR app	0.709			
INT5: If possible, I would use the AR app every time I choose makeup	0.756			
INT6: I intend to use the AR App for shopping in the future	0.712			
INT7: I would like to use the AR App for shopping in the future	0.746			

Table 3. Discriminant validity (Fornell-larcker Criterion).

	Augmented Quality	Innovativeness	Intention to Use AR for Shopping	Perceived Relative Advantage	Self-efficacy
Augmented Quality	0.784				
Innovativeness	0.600	0.798			
Intention to Use AR for Shopping	0.586	0.645	0.766		
Perceived Relative Advantage	0.706	0.581	0.596	0.641	
Self-efficacy	0.607	0.616	0.654	0.476	0.777

Table 4. Relationship with path coefficients.

Paths	Beta	Standard deviation	T statistics	P values	Results
Perceived Relative Advantage -> Self-efficacy	0.399	0.119	6.831	0.002	H1 is accepted
Augmented Quality -> Self-efficacy	0.304	0.106	2.868	0.004	H2 is accepted
Innovativeness -> Self-efficacy	0.622	0.076	8.146	0.00	H3 is accepted
Self-efficacy -> Intention to Use AR for Shopping	0.754	0.044	17.038	0.00	H4 is accepted
Perceived Relative Advantage -> Self-efficacy -> Intention to Use AR for Shopping	0.375	0.091	5.823	0.001	H5 is accepted
Augmented Quality -> Self-efficacy -> Intention to Use AR for Shopping	0.229	0.082	2.779	0.005	H6 is accepted
Innovativeness -> Self-efficacy -> Intention to Use AR for Shopping	0.468	0.062	7.536	0.00	H7 is accepted

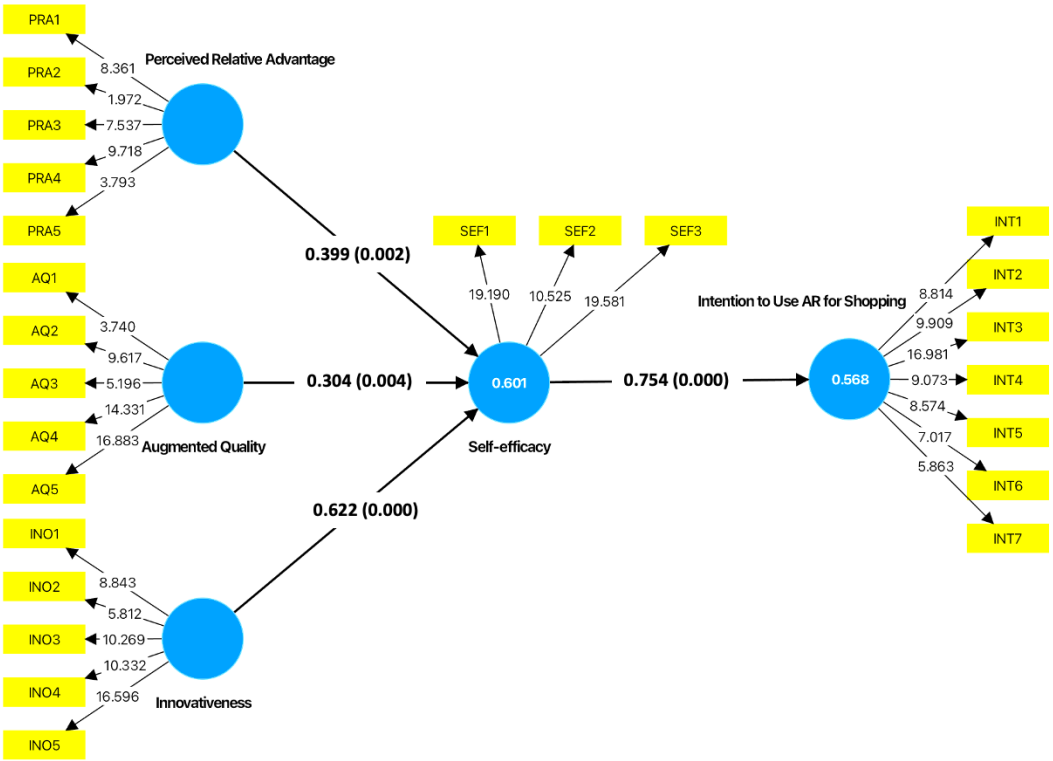

Figure 2. Assessment of structural model.

5. Discussion

The findings offer invaluable insights into the multifaceted factors that influence consumers' intention to adopt AR for shopping and the pivotal role of self-efficacy beliefs in this adoption process. The study unveils a constellation of factors that exert significant influence over consumers' inclination to embrace AR for their shopping endeavors. Among these, perceived relative advantage, augmented quality, and innovativeness emerge as pivotal determinants of consumers' intention to adopt AR for shopping purposes. These findings underscore the importance of consumers' perceptions regarding the superiority of AR-enhanced shopping

experiences over conventional methods, the perceived quality of AR applications, and their predisposition towards embracing novel technological innovations (Lin & Huang, 2024). Such insights provide a robust foundation for devising targeted marketing strategies aimed at accentuating the perceived benefits and quality attributes of AR-driven shopping experiences, thereby fostering greater consumer acceptance and adoption.

Furthermore, the study elucidates the mediating role of self-efficacy beliefs in shaping the relationship between consumers' perceptions of AR and their intention to utilize this technology for shopping. The significant mediating effect of self-efficacy underscores the pivotal role of individuals' confidence in their ability to effectively navigate and utilize AR-enabled shopping platforms. Consumers who harbor greater self-efficacy beliefs are more likely to exhibit heightened intentions to adopt AR for shopping, highlighting the imperative for businesses to cultivate and bolster consumers' self-efficacy through targeted educational initiatives, intuitive interface designs, and comprehensive user support mechanisms (Alam et al., 2021).

The implications drawn from the study's findings hold significant relevance for marketers, retailers, and businesses operating within the retail sector. By delving into the intricacies of consumer behavior and adoption patterns concerning AR for shopping, these implications can guide strategic decision-making and operational initiatives aimed at capitalizing on the transformative potential of AR technologies. The study underscores the importance of strategic marketing initiatives aimed at accentuating the perceived benefits and quality attributes of AR-enabled shopping experiences. Marketers can leverage targeted communication strategies to highlight the superiority of AR-driven shopping encounters over traditional methods, emphasizing factors such as enhanced interactivity, immersive product visualization, and personalized engagement (Davis & Aslam, 2024). By effectively communicating these advantages to consumers, businesses can stimulate interest and intrigue, fostering a positive predisposition towards AR adoption. Augmented quality emerges as a critical determinant influencing consumers' adoption intentions. Businesses must prioritize efforts to enhance the perceived quality of AR applications, ensuring seamless functionality, intuitive user interfaces, and visually compelling experiences (Ng & Ramasamy, 2018). By investing in the refinement and optimization of AR technologies, retailers can bolster consumers' confidence in the efficacy and reliability of AR-driven shopping platforms, thereby facilitating greater acceptance and adoption.

The study highlights the role of consumer innovativeness in shaping adoption behavior. Marketers can target innovative early adopters and trendsetters through tailored marketing campaigns and experiential activations designed to resonate with their progressive mindset (Nasya et al., 2024; Mekonnen, 2024). By positioning AR-enabled shopping experiences as cutting-edge and forward-thinking, businesses can appeal to the innate innovativeness of early adopters, catalyzing widespread adoption and diffusion of AR technologies within the consumer landscape. Self-efficacy emerges as a pivotal mediator in the adoption process, underscoring the importance of consumers' confidence in their ability to effectively utilize AR for shopping purposes. Businesses must prioritize initiatives aimed at empowering consumer self-efficacy through comprehensive user training, intuitive interface designs, and responsive customer support mechanisms. By equipping consumers with the requisite knowledge, skills, and support systems, retailers can mitigate adoption barriers and instill greater confidence in AR technology utilization. Tailoring AR-enabled shopping experiences to align with the unique preferences, needs, and lifestyles of target consumers can enhance engagement and drive adoption. Businesses can leverage AR technologies to deliver personalized product recommendations, virtual try-on experiences, and immersive brand storytelling initiatives, thereby fostering deeper connections and emotional resonance with consumers. By offering customized experiential offerings, retailers can differentiate themselves in the competitive retail landscape and position AR as a compelling value proposition for consumers.

Finally, businesses must adopt a long-term strategic vision that encompasses continuous innovation, adaptation, and evolution in response to shifting consumer preferences and technological advancements. AR technologies represent a dynamic and evolving landscape, and businesses must remain agile and responsive to emerging trends and opportunities. By fostering a culture of innovation and embracing a forward-thinking mindset, retailers can position themselves at the forefront of AR-driven retail innovation, driving sustainable growth and competitive advantage in the digital era (Kumar et al., 2024; Nawres et al., 2024).

In essence, the implications drawn from the study's findings underscore the imperative for businesses to embrace AR technologies as a catalyst for innovation, differentiation, and consumer engagement within the retail sector. By strategically aligning marketing initiatives, enhancing perceived quality, cultivating consumer innovativeness, empowering self-efficacy, delivering customized experiential offerings, and embracing a long-term strategic vision, retailers can unlock the transformative potential of AR and pave the way for a new era of immersive and experiential shopping experiences.

Despite the rich insights gleaned from this study, it is imperative to acknowledge certain limitations that warrant consideration. The study's reliance on a specific sample and context may constrain the generalizability of its findings, underscoring the need for future research endeavors to explore diverse consumer cohorts and contextual settings. Additionally, further investigation into additional factors influencing AR adoption, such as privacy concerns, social influences, and cultural factors, could enrich our understanding of the complex dynamics underlying consumer adoption behavior.

6. Conclusion

This study illuminates critical factors influencing consumers' intention to adopt AR for shopping, with a focus on the mediating role of self-efficacy. The findings underscore the significance of perceived relative advantage, augmented quality, innovativeness, and self-efficacy in shaping consumer adoption behavior in the context of AR-enabled retail experiences. By emphasizing the perceived benefits and quality attributes of AR applications, businesses can stimulate consumer interest and intrigue, fostering a positive predisposition towards AR adoption. Moreover, efforts to enhance the perceived quality of AR technologies through seamless functionality and intuitive user interfaces are crucial to bolstering consumer confidence in AR-driven shopping platforms. Cultivating consumer innovativeness and empowering self-efficacy through targeted marketing initiatives and comprehensive user support mechanisms further facilitate adoption among progressive early adopters and trendsetters. Additionally, tailoring AR-enabled shopping experiences to align with the unique preferences and lifestyles of target consumers can deepen engagement and foster emotional connections, driving sustainable growth in the retail sector. Moving forward, businesses must adopt a long-term strategic vision that embraces continuous innovation and adaptation to remain agile and consumer-centric in an evolving digital landscape. By strategically addressing these factors, businesses can unlock the transformative potential of AR technologies and position themselves at the forefront of AR-driven retail innovation.

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