

Research Article

Exploring the Impact of Augmented Reality on Purchase Intention: The Mediating Role of Perceived Risk in the Indian E-Commerce Context

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Abstract: This research examines the effect of AR apps on purchase intentions of Indian e-consumers and explores the mediating role of perceived risk. Quantitative approach was used for the research, where data collection from 210 participants was carried out using structured online questionnaires. For validating the research model and testing proposed hypotheses, the study used various statistical tests. The results validate that AR experience has a positive and significant impact on consumers' purchase intentions. Moreover, perceived risk moderates this relationship to some extent in such a way that although AR technology may enhance product confidence and consumer interaction, financial, privacy, or functional concerns can reduce its positive impact partially. The present paper provides significant implications for e-commerce companies planning to harness AR as an angle of competitive advantage by presenting these conclusions. In particular, firms that invite investment not just in the quality of AR experiences but also actively deal with consumer risk perceptions in digital marketing interventions to achieve full potential from the technology in influencing consumers' buying habits. The findings contribute to the more general literature on consumer behavior and digital marketing in general, and more so in emerging economies such as India where AR is increasingly adopted but there remain problems with digital trust.

Keywords: Augmented Reality, Purchase Intention, Perceived Risk, E-Commerce

INTRODUCTION

AR has been a revolutionary technology in e-commerce where the customer is able to see products in an interactive form before purchasing. Due to improved smartphone penetration and connectivity in India, AR usage is rising but still, numerous customers feel risks. Although its effects on consumer behavior have already been observed in earlier studies, the mediating role of perceived risk, especially in developing countries such as India, has remained less studied [1]. Augmented reality has been among the most revolutionary recent innovations, revolutionizing the relationship between consumers and commodities and services, especially in the case of e-commerce. It makes it possible to merge digital information with the physical world, enabling customers to see things in context, virtually test them on, and interact with companies [2]. In the context of India, with smartphone penetration taking off and internet penetration increasing at a fast pace, AR is being increasingly used on e-commerce sites to give a rich experience as well as enhancement of the buying process to consumers [3]. Indian shoppers are still somewhat risk-averse towards the use of AR apps, mainly due to perceived risk in the form of financial safety, privacy, and lack of trust in performance. For example, such queries as: Will the item appear in real life exactly as in AR mode? Is it reliable to pay with the process here?

Will my private data be abused? They can directly influence or hinder purchase intentions, and hence it is imperative to realize not only the immediate impact of AR on consumer choice but also intervening psychological factors, including perceived risk, between the two [4]. Past research has provided evidence of the positive impact of AR on consumer involvement, satisfaction, and brand attitude [5]. But most such studies are based in developed economies, where levels of technological infrastructure, consumer confidence, and digital literacy are much higher. Indian-type emerging economies are different and present specific challenges, for instance, compounding consumer profiles, heterogeneous levels of tech-savviness, and increased risk exposure online [6]. This makes India an essential but under-researched context for studying AR. Also, although both technology acceptance research and consumer research have always recognized the function of perceived risk, there aren't many studies that have applied an empirical study to explore its mediating role in the AR–purchase intention relationship, especially in e-commerce. Perceived risk is a multifaceted construct with financial, functional, time, psychological, and privacy uncertainties [7]. Identifying the impacts of these risks on AR-enabled purchasing decisions can provide valuable directions for researchers and practitioners. The incorporation of AR into the purchasing experience on the internet fundamentally

changes the cognitive and affective processes of the consumer. It offers sensory richness, lessens product ambiguity, and increases perceived pleasure [8]. But when customers are overwhelmed by the complexity of technology or suspect data manipulation, these advantages would be diminished or even turned against. Hence, it is of paramount interest to investigate the extent to which AR affects buying intentions, and even how and on what terms it does.

LITERATURE REVIEW

This research seeks to practice and theory by providing a rich-textured account of AR's function in shaping consumer behavior within an emerging economy. The results will enrich the theoretical body of technology acceptance, perceived risk, and consumer choice, while providing e-commerce practitioners with practical solutions to de-escalate consumer anxiety and enhance AR adoption [9]. In the long run, the dream is to make online shopping more enjoyable, secure, and convenient that unlocks the true potential of AR technology. There has been a significant amount of literature regarding augmented reality in e-commerce in recent years, as it is about its revolutionary potential to boost consumer experience, enhance engagement, and stimulate purchase intent [10]. Researchers have examined AR's potential to provide enjoyment and engaging shopping, mitigate product uncertainty, enhance brand perceptions, and build trust [11]. Nevertheless, there are gaps in research. Although most studies have concentrated on advanced economies such as the U.S., Europe, and East Asia, emerging economies such as India with their distinct cultural, technological, and economic settings remain less explored. Additionally, a majority of the studies focus on the direct impact of AR on consumer behavior without proper discussion of mediating mechanisms particularly the function of perceived risk, and it is capable of having a significant influence on technology adoption in low digital trust markets [12]. This section examines the main constructs associated with perceived risk in the present study: augmented reality, purchase intention, and perceived risk from existing empirical research, theory models, and contextual knowledge [13].

AR in E-Commerce

Augmented reality refers to the superimposition of digital information, pictures, sounds, or 3D models onto the physical world that users can engage with both at once [14]. AR in e-commerce allows customers to see products at home or virtually try out products as makeup, apparel prior to a purchase. Past research has proved that AR can improve perceived enjoyment, interactivity, and informativeness and, therefore, make online shopping more attractive [15]. These experiential factors can diminish uncertainty, increase perceived value, and deepen the emotional attachment of the consumer to the brand. The advantages of AR are not unrestrained. Technical complexity, unlearned interfaces, or app performance has the potential to lead to frustration, cognitive overload, or disappointment [16], as some studies advise. Therefore, it is important to understand the psychological and contextual factors for consumers' response to AR, particularly in

markets where there is uneven digital literacy.

Purchase Intention

Purchase intention refers to the probability or intention of a consumer to purchase a product or service during a specified time period [17]. It generally functions as a positive indicator of the resulting purchasing behavior, especially in web-based contexts. Earlier research associates purchase intention with various antecedents such as perceived product quality, price fairness, brand trust, user experience, and emotional involvement [18]. In AR environments, level of senses city and level of interactivity of the experience have been shown to influence purchase intention in a positive manner in that they amplify perceived product fit, minimize ambiguity, and enhance decision-making confidence [19]. The effect is, however, indirect; intermediate drivers such as perceptions of risk, usability problems, or privacy issues have the potential to negate the positive effect, particularly for novice users or new markets.

Perceived Risk

Perceived risk refers to the individual perception of loss or undesirable outcomes resulting from a buying decision. Perceived risk possesses different dimensions such as financial risk, functional risk, social risk, psychological risk, time risk (wasting of time), and privacy risk (exploitation of personal information) [20]. Perceived risk continues to be one of the major hurdles to e-shopping, particularly in nations such as India where customers will be more cautious about fraud, theft of their data, or misrepresentation of a product [21]. Technology-enabled experiences such as AR have been observed to reduce and enhance perceived risk. Even though AR alleviates uncertainty by making products more clearly visible to consumers, it introduces new issues such as data security, device compatibility, or app performance [22]. Most critically, several studies have suggested that perceived risk is the mediator between technological innovation and purchase intention [23]. It is essential that the mediating process is established to design AR experiences that are capable of enhancing consumers' confidence and sales.

Research Questions

- Does AR usage influence purchase intention among Indian consumers?
- Does perceived risk mediate the relationship between AR usage and purchase intention?
- What is the key demographic or behavioral factors that moderate these relationships?

Objectives

- To assess the direct impact of AR experience on purchase intention in the Indian e-commerce market.
- To examine the mediating effect of perceived risk between AR experience and purchase intention.
- To provide actionable recommendations for e-commerce platforms on reducing perceived risks and enhancing AR adoption.

Hypothesis Development

H1: The use of AR positively influences purchase intent.

H2: AR usage negatively influences perceived risk.

H3: Perceived risk negatively affects purchase intention.

H4: Perceived risk mediates between AR usage and purchase intention.

RESEARCH METHODOLOGY

Research Design

A cross-sectional quantitative design using a structured questionnaire was adopted.

Sample

A total of 210 Indian online shoppers, aged 18-45, who have interacted with AR in e-commerce platforms.

Measurement Constructs

The research used established measures for every main construct, which were modified from already validated materials. Every item was scored on a 5-point Likert scale (1 = strongly disagree to 5 = strongly agree). The following table shows the constructs, items, sample items, and sources.

Table 1: Constructs

Construct	No. of Items
AR Experience	6
Perceived Risk	5
Purchase Intention	4

Data Collection

Surveys were distributed online via social media platforms, shopping forums, and mailing lists. A pilot test with 30 respondents ensured clarity and reliability before full-scale data collection.

Demographics

Table 2: Demographics

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	118	56.2
	Female	92	43.8
Age	18-25 years	86	41.0
	26-35 years	76	36.2
	36-45 years	48	22.8
Education	Undergraduate	92	43.8
	Postgraduate	87	41.4
	Others (Diploma/etc)	31	14.8
Monthly Income (INR)	<25,000	52	24.8
	25,001-50,000	88	41.9
	>50,000	70	33.3

The demographic profile indicates a highly balanced gender split and young, tech-savvy audience, with much higher numbers of respondents in the 18-35 age bracket. There is a high percentage of postgraduate-level education, indicating a highly educated, tech-savvy audience. The income profile indicates consumption of AR among middle- and upper-income shoppers, indicating enormous market potential.

RESULTS

Descriptive Statistics

Table 3: Descriptive Statistics

Variable	Mean	SD	Skewness	Kurtosis
AR Experience	4.12	0.58	-0.45	1.10
Perceived Risk	2.85	0.72	0.30	-0.75
Purchase Intention	3.95	0.65	-0.20	0.50

The descriptive statistics of the study variable revealed that the participants rated their overall experience with augmented reality as good (Mean = 4.12, SD = 0.58) on a 5-point scale, suggesting that the AR features were generally liked. The AR Experience scores were slightly negatively skewed (Skewness = -0.45), suggesting that most of the participants reacted to their AR experience with high ratings and some with low ratings. Perceived Risk was in the middle with a moderate mean score of 2.85 (SD = 0.72), as the subjects saw some sort of concern towards risks with AR but not very high-risk perception. The positive skewness (0.30) also demonstrates a bias in favor of lower risk perception by the sample. Purchase Intention scores were also

positive with a mean of 3.95 (SD = 0.65), which represents high purchase intention after experiencing AR technology. The nearly normal distribution (Skewness = -0.20) shows the well-balanced responses towards purchase intention.

Table 4: Reliability Analysis

Construct	No. of Items	Cronbach's Alpha
AR Experience	6	0.91
Perceived Risk	5	0.87
Purchase Intention	4	0.89

The internal consistency of measurement scales' reliability was determined using Cronbach's alpha. They all possessed high reliability: AR Experience ($\alpha = 0.91$), Perceived Risk ($\alpha = 0.87$), and Purchase Intention ($\alpha = 0.89$). All these are greater than the widely regarded cut-off point of 0.70, which shows that the items in the questionnaire accurately measured their respective constructs and that the data were now available for analysis.

Table 5: Correlation Matrix

Variables	1	2	3
1. AR Experience	1		
2. Perceived Risk	-0.45**	1	
3. Purchase Intention	0.62**	-0.38**	1

Pearson correlation tests revealed that high correlations also existed among the constructs. AR Experience was positively correlated with Purchase Intention ($r = 0.62$, $p < 0.01$), showing that higher quality AR experiences have higher willingness to purchase. Perceived Risk negatively correlated with both AR Experience ($r = -0.45$, $p < 0.01$) and Purchase Intention ($r = -0.38$, $p < 0.01$). This would mean that greater perceived risks reduce AR satisfaction and purchasing likelihood, substantiating the hypothesis that risk perception is a vital inhibitory factor.

Table 6: Regression Analysis Predicting Purchase Intention

Predictor	B	SE	β	t	p-value
AR Experience	0.58	0.07	0.54	8.29	< 0.001
Perceived Risk	-0.32	0.08	-0.28	-4.00	< 0.001

Table 7: Model Summary

Predictor	β	p-value
R^2	0.52	
F	56.23	< 0.001

Multiple regression analysis tested the predictive effect of AR Experience and Perceived Risk on Purchase Intention. The model accounted for 52% of the variance in Purchase Intention ($R^2 = 0.52$, $F = 56.23$, $p < 0.001$), indicating that the model is highly explanatory. AR Experience was a significant positive predictor ($\beta = 0.54$, $p < 0.001$), which once again confirmed that greater AR engagement raises purchase intention. Perceived Risk also significantly negatively influenced ($\beta = -0.28$, $p < 0.001$), reaffirming that the higher perceived risk lowers purchase intention. The findings show the duality of AR technology that can initiate purchases while simultaneously discouraging consumer interest due to risk issues.

Table 7: Mediation Analysis

Effect	Estimate (β)	SE	95% CI
Direct effect (AR \rightarrow PI)	0.45	0.06	[0.33, 0.57]
Indirect effect (AR \rightarrow PR \rightarrow PI)	0.13	0.04	[0.06, 0.22]
Total effect	0.58	0.07	[0.44, 0.70]

The mediation test examined whether Perceived Risk intervenes between AR Experience and Purchase Intention. Tests confirmed that there was a significant direct effect of AR Experience on Purchase Intention ($\beta = 0.45$, 95% CI [0.33, 0.57]). The indirect effect via Perceived Risk was also significant ($\beta = 0.13$, 95% CI [0.06, 0.22]), indicating partial mediation. This means that AR Experience reduces perceived consumer risks and, in turn, enhances risk intentions. Implications indicate that reducing perceived risks is essential to maximizing AR's potential to influence consumer purchasing behavior.

DISCUSSION

This research's findings identify the strong impact of augmented reality (AR) on purchase intention of Indian consumers across the e-commerce scenarios. Consistent with past studies, AR experience does have a positive effect on consumer willingness to purchase by engaging in

interactive and immersive product visualization minimizing risk and maximizing confidence in decisions. Yet again, the study identifies the mediating role of perceived risk as a salient factor. While AR can reduce some uncertainties by providing realistic product previews, it, on the other hand, creates concerns about privacy,

financial security, and technology usability, especially in a new market with low digital trust. Such two-way impact turns the benefits of AR ambivalent and risk perceptions contingent. Therefore, technology acceptance models must include perceived risk as a fundamental psychological mechanism to further specify adoption behaviors in the Indian context.

Implications

Theoretically, the current study adds to the current literature on digital consumer behavior by extending the role of perceived risk as a mediator variable between AR and purchase intention, especially in the less-researched Indian e-commerce setting. Pragmatically, the research provides findings that can be applied in practice for online stores and AR developers. Companies must do their best to limit perceived risks via open data policies, secure payments, and easy-to-use AR interfaces to build customer trust and interest. Promotions can use AR as a new channel of engagement and means of minimizing hesitation to buy by communicating consumers' concerns. Policymakers can also think about regulation that provides guarantees of protection for consumer information and enhancing digital literacy to facilitate broader AR use in growing markets.

CONCLUSION

The current research discovers that augmented reality has a significant impact on Indian online consumers' purchase intention, and perceived risk partially mediates the effect. By enriching AR experiences and at the same time reducing the perceived risk of consumers, online shopping websites can best leverage this new technology to enhance sales and customer satisfaction. Future studies can also investigate other mediators and moderators like trust, digital literacy, and product classes in order to have a deeper understanding of the impact of AR on various consumer segments. The research as a whole summarizes the potential but multifaceted role of AR in influencing contemporary retail experiences in developing economies.

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