

UNLOCKING THE POTENTIAL OF AUGMENTED REALITY IN HOSPITALITY: THE ROLE OF TAM, PERCEIVED RISK, PRIVACY, SAFETY, TRUST AND HEDONIC MOTIVATION

Abstract



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Purpose – This study intends to unfold the antecedents of AR adoption intention in the Indian hospitality industry by extending the technology acceptance model (TAM) with perceived risk (PR), privacy (PV), safety (SF), trust (TR) and hedonic motivation (HM).

Design/Methodology/Approach – A quantitative research technique was utilized and an online-survey through Facebook was conducted to collect the data from the Indian consumers. For data analysis, structural equation modeling (SEM) was used with the SPSS and AMOS software.

Findings – The empirical findings revealed that integrating TAM with constructs such as PR, PV, SF, TR and HM resulted in a robust framework for explaining customers' intention to adopt AR in the hospitality industry.

Originality of the research – AR is gaining popularity among consumers due to its ability to offer a wide range of valuable information while establishing a genuine connection with the physical environment. This research is unique as the five additional constructs, viz. PR, PV, SF, TR and HM, are included in the original TAM, thus fulfilling the literature gap. This work endeavors to augment the comprehension of AR and unfolds the antecedents of AR adoption intention in the hospitality industry through the lens of consumers.

Keywords Technology Acceptance Model, Consumer Behavior, Trust, Safety, Privacy, Perceived Risk, Hedonic Motivation

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INTRODUCTION

The hospitality sector has been witnessing an increased surge in the pace of its digital transformation (Cheng et al., 2023). As a result, this sector is implementing novel approaches and methods of operation (Jayawardena et al., 2023). During the pandemic, the use of digital technologies expanded, helping build a robust strategic framework and strengthen security standards (Esposito et al., 2022). Henceforth, the hospitality industry has undergone an interactive and immersive technological revolution (Morosan & DeFranco, 2019).

Immersive technology adoption has become an intrinsic element of the hedonistic lifestyle of humans (Rauschnabel et al., 2019). Immersive technologies, also known as extended reality (XR) technologies, are building new worlds that seamlessly integrate real-world and digital components, enabling hybrid consumer experiences across various levels of integration (Suh & Prophet, 2018). XR technologies like “virtual reality (VR)”, “pure mixed reality (PMR)”, “augmented virtuality (AV)” and “augmented reality (AR)” have paved the way for novel ideas in the hospitality sector. Immersive technologies give consumers a sensation of spatial immersion, affecting their future behaviors (Han & Tom Dieck, 2019). Moreover, it generates novel opportunities for promoting the advancement of a more conscientious consumer culture and enhancing societal well-being (Rauschnabel et al., 2022). By the end of 2035, it is predicted that the Asia-Pacific region will have the second-largest extended reality market, with a share of almost 26% (Research Nester, 2023). India, being a developing nation, exhibits a substantial reliance on the socio-economic advantages offered by the hospitality industry. It is projected that the user base in the AR and VR markets will reach a total of 505.30 million users by the year 2027 (Statista, 2023). AR and VR are next-generation technologies that enable a realistic simulation of the human experience (Yung & Lattimore, 2017).

The increasing consumer interest in immersive technologies- VR and AR has prompted companies like Microsoft, Apple, Alphabet, etc. to invest substantially in this field (Robson, 2023). This paper focuses specifically on AR which encompasses an abundance of applications, comprising but not restricted to games (Das et al., 2017), software applications (Carmigniani et al.,

2010), augmented surgeries (Khor et al., 2016), driving experience (Park et al., 2013) and educational tools (Sahin & Yilmaz, 2020). According to the forecast, the AR market on a global scale is anticipated to experience significant growth, the predicted rise from \$62.75B in 2023 to \$1,109.71B in 2030 (Market Research Report, 2023). The hospitality industry has incorporated various applications of AR technology, such as interactive hotel rooms, interactive maps, beacon technology, gamification and augmented hotel environments (Revfine, 2023).

Given the growing popularity of AR technology in recent years, researchers have begun examining its marketing implications within the hospitality sector (Chen et al., 2022). However, there remains a lack of comprehensive and cohesive analysis of customers' intentions to engage with AR technology, as existing research is still fragmented and limited. Therefore, this study aims to uncover the antecedents of AR adoption intention by examining consumer perspectives, thereby addressing the existing research gap and exploring the potential of AR in the hospitality sector. By drawing upon TAM (Davis, 1989) and other auxiliary variables- PR, PV, SF, TR, and HM, the purpose of this study is to:

1. Scrutinize the primary motivators for customers to embrace and adopt AR in the Indian hospitality industry.
2. Identify the motivations, perceptions, attitudes, and behaviors that drive immersive technology implementation, and
3. Comprehend the effect of AR on hotel guests' experiences.

The current study could assist managers, technology developers, service providers, and industry experts understand the importance of using AR to entice and satisfy customers. It also helps them understand consumer behavior and readiness to adopt new technologies. AR technology adoption by hospitality consumers may empower them to control their surroundings. This research also suggests that hospitality IT manufacturers, managers, and vendors carefully integrate immersive functionalities into new technologies to build strong user-technology experiential relationships.

1. THEORETICAL FRAMEWORK AND HYPOTHESES DEVELOPMENT

1.1 Technology Acceptance Model (TAM)

TAM is a widely recognized and utilized framework in the realm of technology adoption research that predominantly focuses on the examination of individuals' behavioral inclination towards embracing novel technological advancements (Davis, 1989). The empirical research repeatedly indicates that TAM provides a substantial explanation, approximately 40%, for the behavioral intentions of individuals using technology (Venkatesh & Davis, 1996). The TAM postulates two key factors, "Perceived Usefulness (PU)" and "Perceived Ease of Use (PEoU)", that shape people's attitudes towards technology, determining their propensity to use it and their conduct. TAM creates a causal chain of ideas, attitudes, intentions, and actions (Davis, 1989). Though TAM's empirical reliability and parsimony make it a strong foundation for comprehending technology adoption. Contextual adjustments are required when applying it to immersive technologies like AR. AR's reliance on real-time data interaction (e.g., location tracking, tailored overlays) and its experiential character present distinct considerations such as PR (e.g., data misuse) and TR (e.g., system dependability), that transcend beyond PU and PEoU (Shen et al., 2022; Tu & Jia, 2024). The industry is shaped by factors such as varying digital literacy levels, evolving data protection regulations, and heightened privacy concerns influenced by India's Personal Data Protection Act (Naithani, 2024). Moreover, Indian consumers place high importance on experiential hospitality, where HM and TR in digital services play a critical role (Roy et al., 2024). Heterogeneous digital literacy necessitates intuitive AR interfaces (PEoU) for diverse users, and crowded settings demand safety-focused designs. HM drives adoption through immersive experiences (e.g., AR cultural tours), while evolving data laws (e.g., Digital Personal Data Protection Act, 2023) amplify privacy sensitivities (Balasubramanian et al., 2022; Cabrera-Sanchez et al., 2021). Given AR's distinct attributes, an expanded TAM framework is required to account for new drivers impacting consumer adoption. Previous research indicates that users' behavioral intentions in immersive environments are influenced not just by PU and PEoU, but also by PR, TR, and PV (Madi et al., 2024; Bonnin, 2020). This study incorporates these essential characteristics to strengthen TAM's explanatory power, resulting in a more complete understanding of AR adoption in hospitality. However, when it comes to immersive technologies like AR, TAM's fundamental constructs (PU and PEoU) might need to be expanded to take into consideration context-specific elements like PR and TR- all of which are crucial in hospitality contexts (Marriott et al., 2017; Jalilvand & Ghasemi, 2024).

1.1.1 Perceived Usefulness (PU) and Perceived Ease of Use (PEoU)

Davis (1989) describes PU as the measure of a user's belief in the ability of a specific technology to improve efficiency in a specific context. Users are more likely to utilize an app if they understand its functioning (Lee, 2016). In the hospitality industry, PU gains specificity through AR's ability to provide real-time, context-aware information- such as virtual concierge services or interactive menus- thereby improving decision-making efficiency and strengthening adoption intention (Tom Dieck et al., 2024). PEoU measures how intuitive and efficient technology is for a user, requiring little effort and time (Khalil et al., 2023). PEoU focuses on intrinsic incentives and system usage methods and interfaces. Effortless interaction with AR technologies, such as gesture-based navigation, minimizes cognitive strain, increasing PU and developing positive attitudes (Lee et al., 2017; Davis, 1989). People choose systems that are easy to use and require little physical or cognitive effort. TAM has been extensively employed in contemporary hospitality academia to assess technology adoption and

is regarded as one of the most universally embraced frameworks for evaluating consumer behavior (Kim, 2016). Several studies have duly substantiated the efficacy of TAM in discerning the propensity for adoption within a myriad of contextual settings (Azhar et al., 2024; Cheng et al., 2023; Khalil et al., 2023; Lee et al., 2017; Shen et al., 2022; Sujood et al., 2022). In a field where consumers may have diverse technical capabilities, the PEOU focuses on AR application simplicity and usability. For instance, minimally input-intensive AR-powered language translation systems enhance cross-cultural interactions in hotels, highlighting the significance of PEOU in influencing attitudes (Sousa et al., 2024; Sujood et al., 2022). For AR to be generally adopted, it must be easy to use and need little training. PU in hospitality depends on AR's added value to operational efficiency and customer experiences. Through the provision of features like as interactive maps or virtual tours, AR could enhance the entire experience by enhancing consumer engagement. Recent research exhibits that AR's PU in the hospitality industry is enhanced by its capacity to provide context-aware, real-time information (such as virtual concierge services), directly meeting customer needs (Liang & Elliot, 2021). Meanwhile, PEOU is essential for guaranteeing smooth interaction, especially with non-technical users (Azhar et al., 2024; Sujood et al., 2022).

However, by limiting its structure to PU and PEOU, the framework provides less insight into consumers' intentions to adopt certain technologies, so it is necessary to extend the components or combine them with other models to improve TAM's explanatory and predictive power (Kim, 2016). The current research uses the TAM and adds factors to determine Indian hospitality customers' adoption of a novel technology innovation, specifically AR. The incorporation of PR, PV, SF, TR, and HM deals with the particular challenges of AR in the hospitality industry, including issues with data security (PR, PV), user safety in immersive environments (SF), and the influence of enjoyment on adoption (HM) (Bretos et al., 2024; Marriott et al., 2017). Based on the preceding discourse, we propose the following:

- H1:** PU has a positive effect on consumers' intention towards the adoption of AR.
- H2:** PU has a positive effect on consumers' ATT towards the adoption of AR.
- H3:** PEOU has a positive effect on consumers' PU towards the adoption of AR.
- H4:** PEOU has a positive effect on consumers' ATT towards the adoption of AR.
- H5:** ATT has a positive effect on consumers' intention towards the adoption of AR.

1.2 Perceived Risk (PR)

PR can be described as the inherent quality and magnitude of risk that a consumer apprehends when deliberating upon a specific purchase decision (Hwang & Choe, 2019). Consumers' perceptions of risk, however, often become more pronounced when cutting-edge technology is brought up. The phenomenon of PR associated with technological advances has been frequently documented within the field of hospitality (Kim & Qu, 2014). PR serves as a significant impediment to the adoption of innovative technologies (Qian & Yin, 2017). As PR increases, consumers' desire to learn about and use new technology decreases. PR is relevant now because it addresses customer concerns about embracing this new technology. Privacy, greater prices, technical reliability, information accuracy, and learning curve may be factors. AR familiarity decreased risk perception and enhanced sales (Bonnin, 2020). In the context of AR, PR may arise from concerns over data misuse, such as unauthorized access to location data collected by AR applications, or technical malfunctions, like inaccurate virtual overlays disrupting user experiences, which are particularly significant in the hospitality industry where trust is paramount (Ariza-Colpas et al., 2023). PR has been frequently documented to exert a negative impact on individuals' intentions in varied backgrounds (Bonnin, 2020; Khashan et al., 2023). For instance, a study on AR in tourism revealed that perceived financial and functional risks, such as app malfunctions during virtual hotel tours, significantly hindered adoption intention (Jalilvand & Ghasemi, 2024). We, thus put forth following hypothesis:

- H6:** PR has a negative effect on consumers' intention towards the adoption of AR.

1.3 Privacy (PV)

The PV and security of AR systems are the subjects of much technological investigation (De Guzman et al., 2019). PV is important for customized services that save and monitor client preferences using digital technology. Any compromise of customer data might cause a hospitality crisis as customers become more privacy sensitive (Mwemtsi et al., 2021). A technology system requiring the collection of personally identifiable data, including photos, causes anxiety in people (Markos et al., 2018). In the study steered by Feng and Xie (2019), the participants expressed their concerns regarding utilizing their photos. However, when they were provided with more autonomy over the privacy settings of the app, they felt that the level of intrusion was reduced. Previous research has produced mixed results, with some demonstrating a favorable liaison between PV and intention (Merhi et al., 2019; Soodan & Rana, 2020; Harborth & Pape, 2021). In the hospitality sector, the positive impact of PV on AR adoption intention depends on users' sense of control over their data. For instance, AR applications that enable guests to anonymize their virtual interactions- such as masking faces in AR selfies- enhance PV, thereby strengthening adoption likelihood (Israel et al., 2019; Yoon et al., 2021). Thus, we put forward the next hypothesis:

- H7:** PV has a positive effect on consumers' intention towards the adoption of AR.

1.4 Safety (SF)

Emerging technologies for SF encompass a range of advancements, such as VR/AR with many others (Kamaruddeen, 2022). To limit major injuries to minor contusions, Haddadin and Croft (2016) established robot interaction safety. SF implies a user may devote more cognitive resources to AR if a system actively conveys possible threats by preserving situational awareness. In immersive AR, danger alerting and cognitive load control provide safety (Jung et al., 2018). Jain et al. (2014) proposed using AR to improve pedestrian safety. They advised users to utilize their phones' GPS and inertial sensors to assess their safety near potential automobile wrecks. SF is crucial to hospitality customers' AR adoption. Safety considerations immediately impact customers' AR attitudes and engagement. Physical safety, data security and privacy, information reliability, and efficient communication may help hospitality AR users feel secure, confident, and comfortable. Recent research in hospitality suggests that AR systems featuring real-time safety alerts, such as crowd density indicators in AR navigation, play a crucial role in increasing adoption intention by addressing safety concerns (Alzahrani & Alfouzan, 2022). Preceding investigations have identified a favorable affiliation between SF and intention (Montoro et al., 2019; Muangmee et al., 2021). Accordingly, we postulate the next hypothesis:

H8: SF has a positive effect on consumers' intention towards the adoption of AR.

1.5 Trust (TR)

TR in technology is the belief that a technical agent will help a person achieve their goals in an unpredictable and susceptible environment (Lee & See, 2004). TR represents consumers' cognitive perceptions of data confidentiality, quality, and system security (Ponte et al., 2015). TR increases customer confidence in a brand, reduces fear, and may create a strong link with the service provider (Jin et al., 2016). Diffusion of innovation paradigm, systematic promotional efforts are needed to encourage consumer TR in new technologies during pre-adoption. In AR-enabled hospitality, TR is a crucial factor, as the technology depends on real-time data collection- such as location tracking for AR navigation- and immersive interactions, like virtual concierge services, which amplify concerns about personal information misuse (Bilgili et al., 2019). Prior research has yielded mixed findings regarding the association between TR and intention, with evidence indicating both positive (Harborth & Pape, 2021; Merhi et al., 2019; Ponte et al., 2015) and negative (Khashan et al., 2023; Sujood et al., 2022) relationships across diverse contexts. Thus, we put forward the subsequent hypothesis:

H9: TR has a positive effect on consumers' intention towards the adoption of AR.

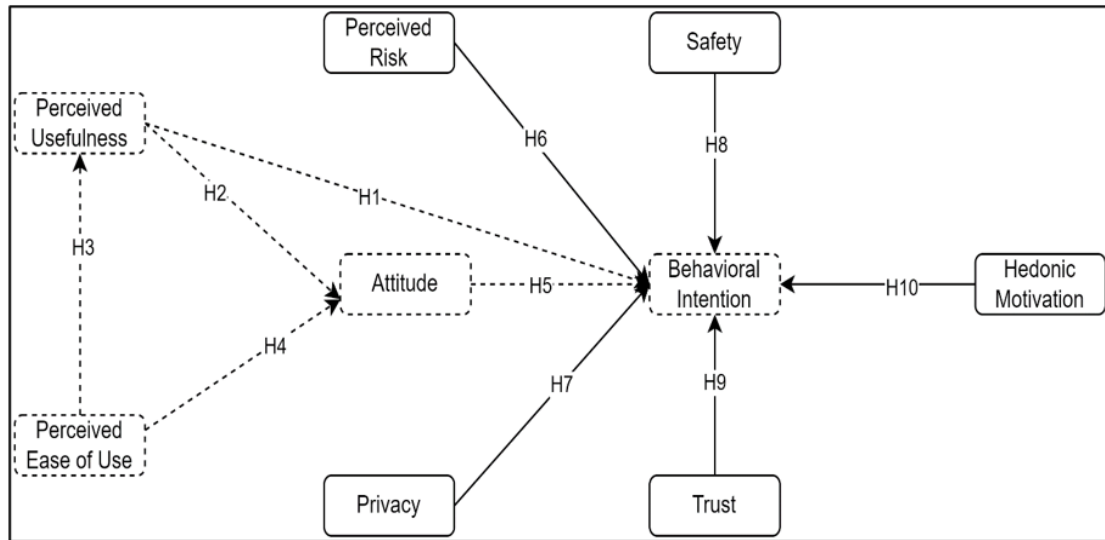
1.6 Hedonic Motivation (HM)

HM refers to people's subjective emotive sensations of pleasure and enjoyment from new technology (McLean & Osei-Frimpong, 2019). By using innovative items, consumers maximize their sensory enjoyment and are more likely to adopt them (Chang et al., 2019). AR technology can help hedonists (Kumar et al., 2016). It is widely acknowledged that people who possess a hedonistic disposition exhibit a tendency towards accepting novelty, variety, and challenging sensory encounters, thereby rendering them more amenable to the adoption of emerging technologies. In the hospitality industry, HM is further heightened by AR's ability to generate playful, immersive experiences (such as AR treasure hunts in hotels or gamified restaurant menus), which transform utilitarian tasks into enjoyable interactions (Deng et al., 2024; Lampropoulos et al., 2022). Multiple investigations have corroborated the affirmative correlation between HM and intention (Calderón-Fajardo et al., 2023; Chang et al., 2019; Khashan et al., 2023; Shen et al., 2022). Hence, the next hypothesis is:

H10: HM has a positive effect on consumers' intention towards the adoption of AR.

The conceptual model is presented in Figure 1.

Figure 1: Conceptual model.



Source: Authors

3. RESEARCH METHODOLOGY

3.1 Measurement

The current study employed measurement items adapted from existing literature, with minor adjustments in language and phrasing to align with the specific aims of this research. To operationalize the fundamental components of the TAM framework—specifically PU, PEoU, ATT, and BI—this study employed measurement items adapted from the foundational works of Davis (1989), Taylor and Todd (1995), and Kucukusta et al. (2015). Additional constructs such as PR, PV, SF, TR, and HM were measured using instruments informed by the studies of Ahadzadeh et al. (2015), Luarn and Lin (2005), Son and Kim (2008), Xie et al. (2021), Gefen (2002), Kim et al. (2011) and Venkatesh et al. (2012).

Appendix A outlines all items used in the study, each rated on a “seven-point Likert scale” from “1 = strongly disagree” to “7 = strongly agree.” To verify the instrument’s content validity, the items were reviewed by two hospitality industry experts, three hospitality scholars, and two professors in the field. Their feedback confirmed the items’ relevance to the study. A pilot test was administered to 40 participants, and all constructs yielded Cronbach’s Alpha values above the acceptable threshold of 0.70, as recommended by Nunnally (1978), thereby supporting the instrument’s reliability.

3.2 Data Collection

Guided by a positivist perspective and quantitative techniques, the model was tested through a cross-sectional survey of individuals following the official Facebook pages of the ten most prestigious hotels in India (Sharma, 2023). An online questionnaire using Google Form was used for data collection from April 10, 2023 to May 30, 2023. To address constraints related to time and location, an online survey format was chosen (Karahoca et al., 2017). The survey link, created via Google Form, was shared on the Facebook pages of India’s leading ten opulent hotels (Sharma, 2023). The sampling process began with convenience sampling and was subsequently extended using the snowball method to increase respondent numbers. Both approaches are recognized for their straightforwardness and expediency (Han & Hyun, 2017). Conveniently, Facebook inboxes were used to encourage spreading the message. The first page of the form gave instructions for reading the research procedures and completing the survey. To promote consistent understanding among respondents, the concept of AR was defined in the initial sentence of the survey. The questionnaire was administered solely to those who had previously visited the targeted hotels.

3.3 Data Analysis and Screening

In the survey, there were 436 respondents initially. Due to inadequate and unclear information, twelve responses were dropped. As a result, 424 responses (97% of the total) made it into the final dataset, which was conducive to analysis. Kline (1998) recommends a 1:10 questionnaire item sample size. With 31 questions, our sample of 424 exceeds this threshold. Cook’s distance approach identified statistical outliers. No variable had a Cook’s statistic over 1 (Kline, 1998). No replies were removed since the greatest observed value was 0.046, significantly below the criterion of 1 (Stevens, 2012), confirming the lack of outliers. To fulfil the necessary conditions for conducting SEM, an evaluation of data normality was conducted. The measures of skewness

and kurtosis were used for this purpose. As illustrated in Table 2, the obtained values for both measures remained within the acceptable bounds of +3 to -3, consistent with George and Mallery's (2019) guidelines, supporting the assumption of normality and the exclusion of outliers. In order to evaluate the problem of "common method bias (CMB)", "Harman's single-factor analysis" was used, which shows that the single component explained 22.76 % of the variance, which is far lower than the 50% cutoff set by Malhotra et al. (2006), thereby confirming the absence of CMB.

Two analysis phases were performed on the data, in alignment with the suggestions of Anderson and Gerbing (1988). Prior to using SEM to investigate the hypothesized connections, "convergent and discriminant validity" were evaluated. The measurements' "validity" and "reliability" would be guaranteed by this two-stage process before we delved into their underlying structural relationships.

4. DATA ANALYSIS AND RESULTS

4.1 Respondents Demographic Profile

The survey witnessed the participation of 424 respondents from the Indian subcontinent (Table 1). Within the complete sample, men constituted 51.65%, while women comprised 48.35%. A notable proportion of participants fell within the age range of 28-37 (40.33%). As many as 39.86% hold a post-graduate degree and 43.16% are employed. Regarding monthly household income, 33.96% of respondents reported an income level ranging from above 80,000 INR.

Table 1: Respondents' Demographic Profile

Items	Frequency (n = 424)	Percent (%)
Gender		
Male	219	51.65
Female	205	48.35
Age (in years)		
18-27	147	34.67
28-37	171	40.33
38-47	76	17.92
Above 47	30	07.08
Qualification		
High School	45	10.61
Intermediate	59	13.92
Graduation	121	28.54
Post-Graduation	169	39.86
Others	30	07.07
Occupation		
Student	54	12.74
Employed	183	43.16
Entrepreneur	118	27.83
Retired	31	07.31
Others	38	08.96
Monthly (Household) Income (INR)		
Up to 20,000	25	05.91
20,001-40,000	51	12.02
40,001-60,000	98	23.11
60,001-80,000	106	25.00
Above 80,000	144	33.96

Source: Primary Data

Table 2 of the descriptive statistics shows that across the board, the range of mean values lies between 4.0105 to 5.1782. Among these variables, PV exhibits the highest mean (5.1782), while PR displays the lowest mean (4.0105). In the same way, the standard deviations (SD) for all the variables are in the range of 0.98584 to 2.03309. Notably, PR has the SD (2.03309), while PU has the lowest SD (0.98584).

4.2 Exploratory Factor Analysis (EFA)

To investigate the association between observable variables and the underlying constructs, we carried out EFA. In order to determine the primary structure of the factors, we used principal component analysis with varimax rotation, following the criterion that Eigenvalues should exceed 1. To determine whether factor analysis was suitable, the “Kaiser-Meyer-Olkin (KMO)” method was used, which yielded a value of 0.843. Which is more than the minimum required limit (0.50) for factor analysis (Kaiser, 1974). The model comprising 9 factors and 31 items accounted for 86.055 % of the variance. The values of “Cronbach’s alpha” were also determined for each construct, which varied from 0.853 to 0.969 (see Table 2).

Table 2: Outcome of EFA

Variables	Items code	Factor loadings	Mean	SD	Skewness	Kurtosis	Cronbach’s alpha
PU			5.1148	0.98584	-0.220	-0.718	0.890
	PU1	.844					
	PU2	.845					
	PU3	.834					
	PU4	.821					
PEoU			4.5528	1.57830	-0.513	-0.650	0.940
	PEoU1	.847					
	PEoU2	.874					
	PEoU3	.888					
ATT			4.3689	1.53869	-0.385	-0.613	0.969
	ATT1	.897					
	ATT2	.888					
	ATT3	.886					
	ATT4	.838					
BI			4.9220	1.48849	-0.656	-0.496	0.942
	BI1	.810					
	BI2	.879					
	BI3	.835					
	BI4	.777					
PR			4.0105	2.03309	-0.289	-1.327	0.934
	PR1	.939					
	PR2	.950					
	PR3	.921					
PV			5.1782	1.34535	-0.784	0.226	0.924
	PV1	.926					
	PV2	.928					
	PV3	.908					
SF			4.9710	1.36140	-0.734	0.198	0.923
	SF1	.911					
	SF2	.922					
	SF3	.936					
TR			5.0667	1.37859	-0.780	0.195	0.953
	TR1	.855					
	TR2	.882					
	TR3	.899					
	TR4	.908					
HM			4.1572	1.29163	-0.092	-0.411	0.853
	HM1	.911					
	HM2	.857					
	HM3	.859					

Source: Primary Data

4.3 Measurement Model

CFA approach was used to validate the measurement model (Anderson & Gerbing, 1988) and results demonstrated a strong alignment with the dataset, substantiated by the following fit indices: $\chi^2/df = 2.947$, RFI = 0.896, TLI=0.929, NFI= 0.911, CFI=0.939, IFI= 0.939, GFI= 0.849, RMSEA= 0.068. While the GFI and RFI values slightly deviate from the widely recommended threshold of 0.90, Baumgartner and Homburg (1996) recommend values above 0.80 to be acceptable. In line with the reliability criteria outlined by Nunnally and Bernstein (1994), all constructs recorded Cronbach's alpha coefficients above 0.70, as detailed in Table 2. For evaluating convergent validity, we used the criteria outlined by Hair et al. (2013), which takes into account the values of factor loading, CR and AVE. These measurements are summarised in Table 3. Based on Fornell and Larcker (1981), the measuring items' construct loadings exceed the 0.70 cut-off. Furthermore, all variables exhibit a CR exceeding 0.70, signifying a commendable level of "internal consistency" and "reliability", as endorsed by Hair et al. (2013). The measurement model is sound and valid because the AVE values comfortably exceed the 0.50 benchmark, meeting Hair et al. (2013) convergent validity criteria.

Table 3: Outcome of CFA

Variables	Items	Factor loadings	CR	AVE
PU	PU1	.85	0.890	0.670
	PU2	.84		
	PU3	.82		
	PU4	.77		
PEoU	PEoU1	.90	0.940	0.840
	PEoU2	.94		
	PEoU3	.91		
ATT	ATT1	.95	0.969	0.888
	ATT2	.96		
	ATT3	.95		
	ATT4	.91		
BI	BI1	.90	0.942	0.804
	BI2	.87		
	BI3	.93		
	BI4	.88		
PR	PR1	.91	0.935	0.827
	PR2	.95		
	PR3	.86		
PV	PV1	.90	0.924	0.801
	PV2	.90		
	PV3	.89		
SF	SF1	.87	0.924	0.802
	SF2	.90		
	SF3	.91		
TR	TR1	.90	0.953	0.836
	TR2	.91		
	TR3	.94		
	TR4	.90		
HM	HM1	.94	0.862	0.678
	HM2	.77		
	HM3	.75		

Source: Primary Data

The assessment of "discriminant validity" adhered to the framework proposed by Fornell and Larcker (1981) which states that the "average variances extracted (AVEs)" from the related latent variables should surpass the square of the correlations among constructs. This criterion was also satisfied in the present study, affirming discriminant validity among the variables. For more details, refer to Table 4.

To complement the Fornell and Larcker (1981) criterion, this study applied the “Heterotrait-Monotrait (HTMT)” ratio approach, as suggested by Henseler et al. (2015), to evaluate “discriminant validity”. The HTMT values for all variables were below the recommended threshold of 0.85, confirming the absence of discriminant validity problems.

The “Variance Inflation Factor (VIF)” was taken into account to ascertain the absence of “multicollinearity”. The values of VIF fall between 1.041 and 1.675, all of which were significantly below the threshold of 5, as Hair et al. (2011) recommended. Consequently, our analysis did not indicate any concerns related to multicollinearity.

Table 4: Discriminant Validity Test

	ATT	TR	BI	PU	PR	PEoU	SF	PV	HM
ATT	0.942								
TR	0.332***	0.915							
BI	0.603***	0.534***	0.897						
PU	0.371***	0.323***	0.427***	0.819					
PR	0.014	0.114*	0.07	0.041	0.91				
PEoU	0.533***	0.419***	0.357***	0.322***	0.113*	0.917			
SF	-0.119*	-0.041	-0.075	0.048	-0.044	-0.111*	0.895		
PV	-0.025	0.002	0.004	0.104†	-0.023	0.076	0.212***	0.895	
HM	0.164**	-0.053	0.157**	0.049	0.092†	0.072	-0.022	-0.079	0.823

*** p< 0.001; square root of AVE diagonally in bold.

Source: Primary Data

4.4 Structural model

The model’s structural fit was deemed satisfactory, as indicated by the fit indices: $\chi^2/df = 2.947$, RFI = 0.896, TLI = 0.929, NFI = 0.911, CFI = 0.939, IFI = 0.939, GFI = 0.849, and RMSEA = 0.068. Following the evaluation criteria that Browne and Cudeck (1992) presented, the GFI and RMSEA values, while indicative of a moderate fit, remained within the acceptable threshold. According to Moutinho et al. (2014), indices above 0.80 are generally acceptable, with a preferred threshold of 0.90. Table 5 offers a complete documentation of the path analysis results, and the structural path model is visually depicted in Figure 2. Seven of the ten hypotheses subjected to rigorous testing garnered empirical support, while three did not find substantiation in the data.

The analysis shows that BI toward AR in the hospitality industry was jointly influenced by PU ($\beta = 0.170$, $t = 4.663$, $p < 0.001$), ATT ($\beta = 0.430$, $t = 11.529$, $p < 0.001$), TR ($\beta = 0.376$, $t = 10.785$, $p < 0.001$), and HM ($\beta = 0.110$, $t = 3.252$, $p < 0.001$). As a result, hypotheses H1, H5, H9, and H10 were supported. These variables accounted for around 53% of the variance in BI ($R^2 = 52.8$).

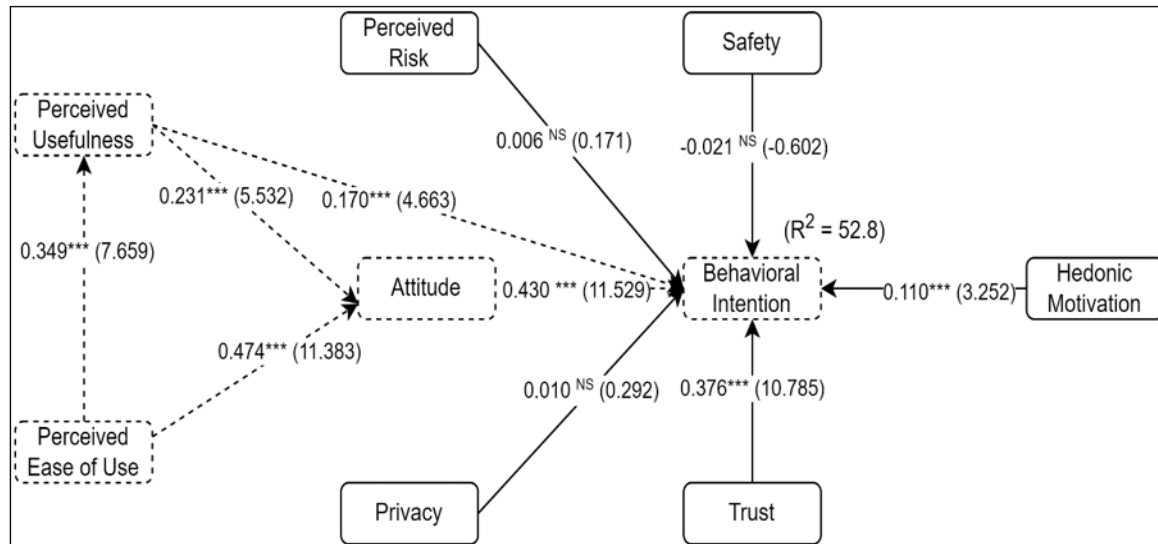
On the contrary, the impact of PR ($\beta = 0.006$, $t = 0.171$), PV ($\beta = 0.010$, $t = 0.292$), and SF ($\beta = -0.021$, $t = -0.602$) on BI toward AR in the hospitality industry was found to be non-significant. Therefore, H6, H7, and H8 were not supported. ATT, however, was influenced by PU ($\beta = 0.231$, $t = 5.532$) and PEoU ($\beta = 0.474$, $t = 11.383$), accounting for about 35% of the variance in ATT, thereby supporting H2 and H4. Furthermore, PU was significantly affected by PEoU ($\beta = 0.349$, $t = 7.659$), providing additional support for H3.

Table 5: Hypotheses Testing Results

Hypothesis	Relationship	β -value	t-statistic	p-value	Results
H1	PU → BI	0.170	4.663	< 0.001	Supported
H2	PU → ATT	0.231	5.532	< 0.001	Supported
H3	PEoU → PU	0.349	7.659	< 0.001	Supported
H4	PEoU → ATT	0.474	11.383	< 0.001	Supported
H5	ATT → BI	0.430	11.529	< 0.001	Supported
H6	PR → BI	0.006	0.171	0.864	Not Supported
H7	PV → BI	0.010	0.292	0.770	Not Supported
H8	SF → BI	-0.021	-0.602	0.547	Not Supported
H9	TR → BI	0.376	10.785	< 0.001	Supported
H10	HM → BI	0.110	3.252	< 0.001	Supported

Source: Primary Data

Figure 2: **Structural Model**



Source: Primary Data

5. DISCUSSION AND CONCLUSION

By extending the TAM model to incorporate PR, PV, SF, TR, and HM, the current study analysed the determinants influencing AR adoption intention in the hospitality sector. It was conducted to enhance the credibility of the research outcomes among a sample of Indian consumers.

PU shows a statistically significant positive association with BI ($\beta = 0.170$). Hence, H1 is supported. This finding agrees with earlier studies (Huang et al., 2013; Kim, 2016; Sujood et al., 2022; To & Trinh, 2021). The outcome highlights that adopting AR would yield enhanced time efficiency and expedite the execution of consumer tasks. This idea stems from a belief held by consumers that AR technology can enhance their hospitality experience through engaging services like in-room ambience, AR wayfinding, AR-enhanced mobile apps, etc.

The findings further unveil that PU positively and significantly ($\beta = 0.231$) influences ATT. Hence, H2 is supported. This result validates the findings of earlier research that PU is a crucial factor influencing ATT (Kim & Han, 2022; Lee et al., 2017; Sanayei & Bahmani, 2012). It can be inferred that the PU has the potential to foster a favourable attitude by enhancing efficiency and ease of using AR. The observed outcome could potentially be traced to the various benefits that the hospitality industry offers to enhance the overall guest experience, like improved comfort, management, accessibility, efficacy, and pleasure, enabled by immersive technology of AR in the hospitality sector.

The results further show that PEOU strongly and favourably affects PU ($\beta = 0.349$). Thus, it substantiated hypothesis H3. That is, if using AR requires little effort and allows users to attain their goals effortlessly, they will regard the technology as more useful. The preceding research coincides with the findings (Huang & Liao, 2015; Khalil et al., 2023; Lee et al., 2017; Wang et al., 2022). This means that the comprehension of AR technology by consumers has resulted in a favourable influence on their perception of adopting AR in the hospitality industry. Indian consumers exhibit a preference for technology that possesses a user-friendly interface and necessitates minimal external or intellectual exertion. Rendering immersive technologies that are simple to use and operate may dramatically influence consumers' willingness to accept AR.

Findings further support H4 since there is a positive and significant relationship between PEOU and ATT ($\beta = 0.474$). This is consistent with earlier studies (Chung et al., 2015; Kim & Han, 2022; Lee et al., 2017). This observation may be pertinent to the generally positive ATT of Indian consumers toward the potential AR in the hospitality industry. Neuhofer et al. (2015) suggest that using immersive technologies in hotels could provide guests with more optimised, efficient service interactions. The TAM-derived associations between the research variables were all supported.

According to the research's findings, a significant and positive relation between ATT and BI ($\beta = 0.430$) is observed thus, validating H5. Therefore, Indian consumers' positive ATT about AR adoption are associated with a higher intention of utilising it to improve their experiences in the hospitality sector. In accordance with the past research (Lee et al., 2017; Sanayei & Bahmani, 2012), our findings showcases that positive ATT towards digital innovations and scientific advancements primarily drive the adoption of novel technologies at service destinations.

Further, PR does not exhibit a significant association ($\beta = 0.006$) with BI. Hence, H6 stands unsupported. This finding matches with the previous study (Azhar et al., 2024; Faqih, 2016). A probable reason could be that consumers perceive the adoption of AR to be a more favourable and immersive experience rather than associating it with any negative connotations or risks. This could be attributed to consumers' lack of experience with the potential dangers of AR technology in stressful situations. The outcomes appear to contradict the findings of many earlier research investigations (Bonnin, 2020; Khashan et al., 2023). In these studies, the consumers perceive associated risks in using AR technology because of security concerns or would require more time to comprehend information.

The findings further demonstrate an insignificant association between PV and BI ($\beta = 0.010$), not supporting H7. Despite countering earlier research (Merhi et al., 2019; Soodan & Rana, 2020) it aligns with some of the previous studies (Dhagarra et al., 2020; Harborth & Pape, 2021). Indian consumers did not exhibit any level of apprehension regarding PV about their intention to adopt AR technology for services provided by the hospitality sector. A possible reason could be their unawareness towards the privacy breach regarding their personal data. This observation could be related to the predominant belief among consumers that AR companies would exclusively utilise personal data with explicit consent, primarily to enhance their services and analyse user preferences and usage habits.

The relation between SF and BI to adopt AR in the hospitality industry is found to be insignificant ($\beta = -0.021$). Therefore, H8 does not support. Despite the contradiction with the earlier research (Montoro et al., 2019; Muangmee et al., 2021), the finding aligns with the previous finding (Faqih, 2016). The definitive results demonstrate that safety does not affect the intention to adopt AR in hospitality services. Indian consumers may not prioritise safety and may overlook potential hazards associated with using AR. They may not be aware of the risks and concerns related to potential AR security and safety measures.

The study demonstrates a significant and positive relationship between TR and BI ($\beta = 0.376$). Thus, H9 is supported, which follows the previous studies (Baabdullah, 2018; Dhagarra et al., 2020; Faqih, 2016). This suggests that higher TR in technology will culminate in more intentional behaviour to validate. This finding might be addressed because the TR assists Indian consumers in assuming that the AR technology operators in the hospitality industry can provide services that are trustworthy and reliable. The outcome suggests that consumers are open to trying out cutting-edge technologies despite their lack of prior experience with them.

Lastly, HM has a positive and significant association with the BI ($\beta = 0.110$) towards AR adoption in the hospitality industry. Hence, H10 is supported, corroborating with earlier investigations (Baabdullah, 2018; Chang et al., 2019). The rationale for this result might be that a higher level of playfulness or HM resulted in a more favorable usage intention toward AR applications. This result emphasised the significance of playfulness, fun, joy, and entertainment as deciding standards for implementing AR technologies in the hospitality industry. Consumers are eager to experiment with AR technologies despite any prior knowledge of its application.

6. IMPLICATIONS

6.1 Theoretical Implications

Overall, our research provides several significant contributions. First, our work complements the literature on hospitality by emphasising the importance and potential of AR by exploring the relevant factors, demonstrating that innovating and adapting to this modern tool offers novel opportunities (Rauschnabel et al., 2019). Regarding the authors' understanding and awareness, this study is first of its kind that analyses the relationship between the extended TAM model with PR, PV, SF, TR, and HM in the context of the Indian consumers' willingness to adopt AR in the hospitality industry. This investigation confirmed the validity of the extended TAM model, which should aid future studies in estimating customers' perceptions of other immersive technologies by providing deeper insights into the behavioral perspective (Kim et al., 2020). The current study significantly contributes to the theoretical progress of technology adoption research in hospitality, particularly in emerging countries. Rather than just verifying current models, our findings expand TAM to include PR, PV, SF, TR, and HM. This addition supports Nunkoo and Armbrrecht's (2025) notion that theorization should go beyond using known frameworks and instead provide fresh conceptual contributions.

In addition, this study focuses on the Indian consumers' perspective, which might serve as a foundation stone for similar studies in developing countries to follow the factors that accelerate the adoption of this AR technology. Our findings demonstrate that AR adoption in hospitality is influenced not just by system-centric aspects, but also by experiential and psychological elements, expanding the conversation on consumer behavior in technology-mediated hospitality contexts. Furthermore, by concentrating on Indian consumers, our study gives insight into how cultural and market-specific variables influence AR adoption, providing a viewpoint that might drive future research on immersive technology in emerging countries. Furthermore, it will enable them to comprehend the behavioral psychology of consumers regarding their acceptance of novel technological innovations and their level of readiness to embrace them. AR technology adoption by consumers in the hospitality sector is likely to result in a sense of empowerment, i.e. more in control of their surroundings (Davis, 1989). This study also supports the idea that connecting consumers through intriguing technologies results in a distinctive acceptance direction than that drawing just from system assumptions, advancing the theory on consumer behavior in experiential technology-mediated hospitality contexts.

6.2 Practical Implications

This study explores the assistance of AR for the hospitality industry and anticipates Indian consumers' intent towards its adoption in the hospitality industry. This research will enable managers and policymakers in the hospitality sector to identify the necessary variables to integrate AR technology, which can potentially change the hospitality industry's future. Because PEOU and PU had an enormous and positive effect on attitude, hospitality executives who want to adopt AR should extensively evaluate and grasp how clients respond to technological updates. Hotels should aggressively advertise new and immersive technology to visitors by highlighting how easy, useful, and valuable they are (Kim & Han, 2022). The present study likewise assists managers in understanding and foreseeing user behavior and acceptance of new technology (Montargot & Ben Lahoul, 2018; Song et al., 2024). This study also has significance for product creation since it suggests that enhancing consumer interactions through highly immersive technological settings might be the future direction for product/process design in the hospitality sector.

To gain widespread acceptance, positive attitudes about AR must be established and strengthened since attitude positively influences intention to adopt AR. Identifying specific requirements and issues of modern technologies in the hospitality industry is critical since hospitality managers may achieve higher adoption through personalised marketing. Hotel administrators and owners must optimise operations, simplify procedures, and provide more personalised service to satisfy guests to keep them highly engaged (Bae & Kim, 2024). In this regard, hospitality industry experts must identify target consumers who are part of the explorer and pioneer sectors in their early stages of operation. Consumers anticipate that these applications will be fascinating, appealing, and entertaining (Jalilvand & Ghasemi, 2024). As a result, developers and hospitality managers should strive to consider these characteristics while designing user-friendly AR technologies that foster a sense of reliance among consumers, thereby cultivating a desire to utilise them consistently upon encountering them (Lim et al., 2024).

7. LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

In spite of the theoretical and practical depth of our study, certain limitations are still there that pave the foundation for future research. Firstly, the study chose readily available Indian consumers using convenience sampling. Representativeness and bias may be issues with this strategy. Thus, caution is needed when applying the findings to diverse regions. To collect data from international residents, future studies may use cross-national questionnaires. This technique would highlight cultural disparities in AR adoption intentions and enable flexible and in-depth analysis of customers' technological acceptance experiences. Secondly, this investigation only examines the hospitality industry's desire to embrace AR since it prioritises consumer satisfaction. Different sectors or environments may not fulfil or surpass customer expectations using AR. Thus, future research should include PMR, VR, AV, and XR and their consumer perception in the hospitality industry to compare these technologies and emphasise the importance of responsible adoption and implementation. Thirdly, data gathering over a limited timeframe may not capture all behavioral intents. Future scholars may utilise a vertical survey to establish verifiable causal linkages between variables to assess the framework's resilience across time. Fourthly, the findings indicated that consumers perceive AR as a reliable, enjoyable, and motivating technology that guarantees their privacy without any associated risks. However, concerns may arise over the authenticity of experiences and appropriate consumption, potentially leading to physical and psychological damage. Hence, there is an avenue for further investigation into the post-adoption behavior of consumers and their desire to continue using hospitality services. Final limitation of this study is related to the data assumption tests. While univariate skewness and kurtosis values were within the acceptable range (± 3), we did not perform a multivariate assessment of skewness and kurtosis. Future studies are encouraged to incorporate multivariate normality checks to enhance the robustness and generalizability of findings.

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APPENDIX - A

Perceived usefulness (Davis, 1989)

- PU1 - Using AR in hospitality industry would save my time.
- PU2 - Using AR in hospitality industry would enable me to accomplish tasks more quickly.
- PU3 - Using AR in hospitality industry would be easier for me.
- PU4 - Overall, I find AR in hospitality industry useful for me.

Perceived ease of use (Davis, 1989)

- PEoU1 - I find AR in hospitality industry to do what I would want to do.
- PEoU2 - My interaction with AR in hospitality industry would be easy for me to understand.
- PEoU3 - It would be easy for me to remember how to use AR in hospitality industry.
- PEoU4 - AR in hospitality industry would provide helpful guidance.
- PEoU5 - Overall, I find AR in hospitality industry easy to use.

Attitude (Taylor & Todd, 1995)

- ATT1 - Using AR in hospitality industry would be a good idea.
- ATT2 - Using AR in hospitality industry would be a wise idea.
- ATT3 - Using AR in hospitality industry would be pleasant experience.
- ATT4 - I like the idea of using AR in hospitality industry.

Perceived risk (Ahadzadeh et al., 2015; Luarn & Lin, 2005)

- PR1 - Using AR in hospitality industry may be risky.
- PR2 - Using AR in hospitality industry may negatively affect my health.
- PR3 - Using AR in hospitality industry may divulge my personal information.

Privacy (Son & Kim, 2008)

- PV1 - Using AR in hospitality industry may expose me to fraud or monetary loss.
- PV2 - Using AR in hospitality industry may jeopardise my privacy.
- PV3 - Using AR in hospitality industry may be insecure.

Safety (Xie et al., 2021)

- SF1 - I may get nervous easily while using AR in hospitality industry.
- SF2 - Safety is important to me while using AR in hospitality industry.
- SF3 - Safety always comes first while using AR in hospitality industry.

Trust (Gefen, 2002; Kim et al., 2011)

- TR1 - I think I would trust AR in hospitality industry.
- TR2 - I think AR in hospitality industry would be reliable.
- TR3 - I think AR in hospitality industry would be trustworthy.
- TR4 - Even if not monitored, I would trust AR in hospitality industry.

Hedonic Motivation (Venkatesh et al., 2012)

- HM1 - Using AR in hospitality industry would be fun.
- HM2 - Using AR in hospitality industry would be enjoyable.
- HM3 - Using AR in hospitality industry would be entertaining.

Intention (Taylor & Todd, 1995; Kucukusta et al., 2015)

- INT1 - I intend to use AR in hospitality industry in the near future.
- INT2 - I intend to use AR in hospitality industry frequently in the near future.
- INT3 - I will use AR in hospitality industry on a regular basis in the near future.
- INT4 - I will strongly recommend AR to others in hospitality industry.