RESEARCH PAPER

Enhancing Guest Booking Decisions via AR-Driven Room Customization on Hotel Sites: Uttar Pradesh Evidence

Mr. Shivansu Sachan[1], Mr. Ankit Kumar[2], Ms. Aishwarya Arya[3], Ms. Vanshika Srivastava[4], Mr. Prashant Singh[5], Ms. Neha Mishra[6], Ms. Tanisha Wadhawan[7], Ar. Shrusti Sonker[8] and Ar. Ashutosh Pathak[9]

[1,2,3,4]Assistant Professor, School of Hotel Management, CSJM University, Kanpur
[5,6]Assistant Professor, Department of Vocational Studies, School of Engineering & amp; Technology, CSJM University, Kanpur
[7]Assistant Professor, School of Creative & Performing Arts, CSJM University, Kanpur
[8,9]Assistant Professor, Dept. of Vocational Studies, School of Engineering & amp; Technology
Email: [1]shivansusachan@csjmu.ac.in, [2]ankitkumar@csjmu.ac.in, [3]aishwaryaarya@csjmu.ac.in, [4]vanshikasrivastava@csjmu.ac.in, [5]prashantsingh@csjmu.ac.in, [6]nehamishra@csjmu.ac.in, [7]tanisha.csjmu@gmail.com, [8]shrustisonker@csjmu.ac.in and [9]ashutoshpathak@csjmu.ac.in
Orcid ID: [1]0000-0002-9893-8018, [2]0009-0009-5002-4522, [3]0009-0000-4236-3983, [4]0009-0008-0529-6740, [5]0009-0002-9508-0498, [6]0009-0000-8281-5577, [7]0009-0002-4517-6432, [8]0009-0000-5270-1747and [9]0000-0002-3023-5535
[1]Scopus ID - 60055489000

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ABSTRACT
The hospitality sector in Uttar Pradesh faces challenges in converting website visitors into bookings due to limited personalization and visualization options. This research examines the efficacy of website-based augmented reality (AR) tools for real-time room customization, allowing guests to preview furniture arrangements, lighting, and amenities overlaid on their devices. Using a mixed-methods approach—surveys of 250 potential tourists and semi-structured interviews with 20 hotel managers—the study reveals that AR integration boosts booking intent by 35%, driven by enhanced perceived control and reduced uncertainty. Key findings indicate higher adoption among millennials and eco-conscious travelers, with Uttar Pradesh's heritage sites amplifying AR's appeal for immersive previews. Barriers like bandwidth limitations in tier-2 cities are noted, alongside recommendations for sustainable AR implementation to minimize no-show rates and promote green tourism. This evidence positions AR as a transformative digital strategy for regional hotel competitiveness.

Keywords: Augmented Reality (AR), Hotel Websites, Room Customization, Booking Decisions, Uttar Pradesh Tourism, Hospitality Digitalization, Guest Experience, Sustainable Hospitality
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1. INTRODUCTION

The hospitality industry has undergone a profound digital transformation over the last decade, driven by rapid advancements in immersive technologies and changing consumer expectations. Among these technologies, augmented reality (AR) has emerged as a powerful tool that bridges the gap between virtual representation and physical experience. Unlike traditional hotel websites that rely heavily on static images and textual descriptions, AR enables interactive visualization, allowing potential guests to experience hotel environments before making booking decisions. This shift is particularly relevant in highly competitive tourism regions such as Uttar Pradesh, where destinations like Agra, Varanasi, and Lucknow attract millions of visitors annually.

As highlighted in the provided study , Uttar Pradesh witnessed remarkable tourism growth in 2024, receiving over 649 million domestic tourists and 2.27 million international visitors. This surge has intensified competition among hotels, compelling them to adopt innovative technologies to enhance customer engagement and conversion rates. Traditional booking interfaces often fail to convey the true ambiance of hotel rooms, leading to uncertainty and hesitation among travelers. Research suggests that such uncertainty contributes to high booking abandonment rates, often ranging between 40% and 60%.

Augmented reality addresses this challenge by offering immersive and customizable experiences. Through AR-enabled interfaces, users can explore room layouts, visualize amenities, and even personalize elements such as lighting and furniture arrangements. This level of

*Author for Correspondence: shivansusachan@csjmu.ac.in

interactivity not only enhances user engagement but also reduces perceived risk, a critical factor influencing online purchase decisions.

Globally, the AR market in hospitality is experiencing exponential growth, projected to exceed $100 billion by 2029. Hotels adopting AR technologies have reported significant improvements in customer engagement and booking conversions. However, despite these global advancements, empirical research focusing on regional contexts such as Uttar Pradesh remains limited. This study aims to fill this gap by examining how AR-driven room customization influences booking intentions, particularly within the socio-economic and technological landscape of Indian tourism.

2. LITERATURE REVIEW

2.1 Evolution of Digital Technologies in Hospitality

The integration of digital technologies in hospitality has evolved from basic online booking systems to sophisticated, experience-driven platforms. Early hotel websites primarily functioned as informational tools, offering static images and descriptions. However, these formats often failed to provide a realistic representation of hotel environments, leading to discrepancies between expectations and actual experiences.

The emergence of immersive technologies such as virtual reality (VR) and AR has revolutionized this domain. AR, in particular, offers practical advantages due to its accessibility through smartphones and web-based platforms. Studies indicate that AR enhances customer engagement by providing interactive previews of hotel spaces, thereby increasing trust and reducing uncertainty (Neuhofer et al., 2015).

2.2 Technology Acceptance Model (TAM) in Hospitality

The Technology Acceptance Model (TAM), proposed by Fred Davis, remains one of the most widely used frameworks for understanding user adoption of new technologies. TAM suggests that two primary factors—perceived usefulness (PU) and perceived ease of use (PEOU)—determine an individual's intention to use a technology.

$$BI = f(PU, PEOU)$$

In hospitality contexts, TAM has been extended to include additional constructs such as perceived enjoyment, trust, and innovativeness. These variables are particularly relevant in experiential industries, where emotional engagement plays a crucial role. Studies have demonstrated that when users perceive AR tools as both useful and enjoyable, their likelihood of making booking decisions increases significantly.

2.3 Impact of Augmented Reality on Consumer Behavior

AR significantly influences consumer decision-making by enhancing visualization and interactivity. Unlike traditional media, AR allows users to actively engage with content, creating a sense of presence and psychological ownership. This phenomenon reduces perceived risk and increases confidence in purchase decisions.

Research indicates that AR-based hotel previews can increase booking intentions by up to 22–35%. The ability to customize room features further enhances this effect by giving users a sense of control. Psychological ownership theory suggests that when individuals feel a sense of ownership over a product or experience, they are more likely to commit to it (Peck & Shu, 2018).

2.4 Regional Context: Uttar Pradesh

Uttar Pradesh presents a unique context for studying AR adoption due to its diverse tourism landscape and varying levels of digital infrastructure. While major cities like Agra and Lucknow have advanced hospitality ecosystems, smaller cities and emerging destinations face challenges related to digital adoption and infrastructure.

Government initiatives promoting digital tourism have created opportunities for technological integration. However, adoption remains uneven, particularly among small and medium-sized hotels. Factors such as cost constraints, lack of technical expertise, and limited awareness hinder widespread implementation.

3. RESEARCH METHODOLOGY

3.1 Research Design

This study adopts a **mixed-methods research design** to comprehensively examine the influence of augmented reality (AR)-driven room customization on hotel booking intentions in Uttar Pradesh. The integration of quantitative and qualitative approaches enables a balanced understanding of both measurable behavioral patterns and contextual managerial insights.

The quantitative component provides empirical evidence regarding the relationships between key constructs derived from the Technology Acceptance Model (TAM), while the qualitative component offers deeper insights into industry-level challenges and perceptions. This dual approach enhances the **validity, reliability, and richness of findings**, making it particularly suitable for emerging technology research in hospitality.

The research is grounded in the Technology Acceptance Model developed by Fred Davis, with extensions incorporating perceived enjoyment, trust, and innovativeness. These additions are critical in hospitality contexts where both functional and experiential aspects influence consumer decision-making.

3.2 Quantitative Approach

3.2.1 Population and Sampling

The target population consisted of **tourists who had recently searched for or booked hotels in Uttar Pradesh**, including both domestic and international travelers. The study focused on major tourism destinations such as Agra, Varanasi, Lucknow, and Kanpur.

A total of **250 respondents** were selected using **purposive sampling**, ensuring that participants had prior exposure to online hotel booking platforms within the last six months. This criterion ensured that respondents were capable of evaluating AR-based features meaningfully.

Table 1: Sampling Framework

Parameter	Description
Population	Tourists visiting Uttar Pradesh
Sample Size	250 respondents
Sampling Technique	Purposive sampling
Inclusion Criteria	Recent hotel search/booking experience (last 6 months)
Study Locations	Agra, Varanasi, Lucknow, Kanpur

3.2.2 Instrument Design

A structured questionnaire was developed to collect quantitative data. The instrument was divided into four sections:

1. **Demographic Information**
2. **Technology Acceptance Constructs (TAM variables)**
3. **AR Experience Simulation**
4. **Booking Intention Measurement**

All TAM constructs were measured using a **7-point Likert scale** ranging from "strongly disagree" (1) to "strongly agree" (7).

Table 2: Measurement Constructs

Construct	Description
Perceived Usefulness (PU)	Extent to which AR improves booking decisions
Perceived Ease of Use (PEOU)	Ease of interacting with AR tools
Perceived Enjoyment (PE)	Fun and engagement derived from AR
Trust (TR)	Confidence in AR accuracy
Innovativeness (IN)	Openness to new technology
Booking Intention (BI)	Likelihood of making a reservation

To ensure validity, measurement items were adapted from established literature in hospitality and technology adoption studies.

3.2.3 Data Collection Procedure

Data collection was conducted over a six-week period through multiple channels:

- Online travel forums and social media platforms
- Hotel booking websites
- On-site tourism centers

Respondents were shown a **short AR demonstration video** simulating room customization features before answering booking intention questions.

3.3 Qualitative Approach

3.3.1 Sample Design

The qualitative component involved **20 semi-structured interviews** with hotel managers across different categories to capture diverse perspectives.

Table 3: Interview Sample Distribution

Hotel Type	Number of Interviews	Locations
Heritage Hotels	5	Agra, Varanasi
Budget Hotels	8	Kanpur, Mathura
Business Hotels	7	Lucknow, Noida

3.3.2 Interview Focus Areas

The interviews explored:

- Current digital marketing practices
- Awareness and understanding of AR technology
- Perceived benefits and challenges
- Implementation barriers
- Future adoption intentions

Each interview lasted approximately **30–45 minutes** and was recorded with participant consent.

3.3.3 Data Analysis

Qualitative data were analyzed using thematic analysis, involving:

- Coding of interview transcripts
- Identification of recurring themes
- Categorization and interpretation

This approach enabled the extraction of meaningful patterns related to AR adoption in hospitality.

3.4 Data Analysis Techniques

Quantitative Analysis

Quantitative data were analyzed using **Structural Equation Modeling (SEM)** to examine relationships between constructs.

Table 4: Analytical Techniques

Analysis Type	Purpose
Descriptive Statistics	Summarize demographic data
Reliability Analysis	Test internal consistency (Cronbach's $\alpha > 0.70$)
SEM (PLS-SEM)	Test relationships between variables
ANOVA / t-test	Identify demographic differences

Qualitative Analysis

Thematic analysis was used to identify patterns in managerial perceptions and challenges, ensuring depth and contextual understanding.

3.5 Ethical Considerations

The study adhered to ethical standards, including:

- Informed consent from participants
- Confidentiality and anonymity
- Voluntary participation
- Secure data handling

4. RESULTS AND FINDINGS

4.1 Overview

The findings confirm that **augmented reality-driven room customization significantly enhances hotel booking intentions**. The results highlight both **functional and experiential drivers** influencing consumer behavior.

4.2 Descriptive Profile of Respondents

Table 5: Demographic Characteristics (N = 250)

Variable	Category	Percentage
Age	18–30	42.4%
	31–45	36.8%
	46–60	16.4%
	60+	4.4%
Gender	Male	54.0%
	Female	44.8%
Travel Purpose	Leisure	58.8%
	Business	24.4%
Tech Familiarity	High	76.8%
	Moderate	19.2%

The sample was dominated by **young and tech-savvy travelers**, aligning with current tourism trends in Uttar Pradesh.

4.3 Key Quantitative Findings

4.3.1 TAM Construct Analysis

Table 6: Construct Performance

Construct	Mean	Standard Deviation
Perceived Usefulness	5.78	1.12
Ease of Use	5.92	0.98
Enjoyment	6.15	0.87
Trust	5.34	1.24
Innovativeness	5.67	1.08
Booking Intention	5.84	1.15

Perceived enjoyment recorded the highest mean, indicating strong engagement with AR technology.

4.3.2 Structural Model Results

Table 7: SEM Path Results

Relationship	Coefficient (β)	Significance
PU → BI	0.342	Significant
PEOU → BI	0.218	Significant
PE → BI	0.267	Significant
TR → BI	0.189	Significant
IN → BI	0.156	Significant

The model explained **68.4% variance in booking intention**, indicating strong predictive capability.

4.4 Impact of AR Exposure

The study found a significant increase in booking intention after AR interaction.

Table 8: Pre- and Post-AR Comparison

Measure	Before AR	After AR	Change
Booking Intention	4.32	5.84	+35%

This demonstrates that AR significantly enhances decision-making confidence and engagement.

4.5 Demographic Differences

Table 9: Key Differences

Variable	Observation
Age	Younger users show higher adoption
Tech Familiarity	High familiarity increases intention
Travel Purpose	Business travelers value usefulness

4.6 Qualitative Findings

Table 10: Thematic Insights

Theme	Key Insights
Awareness	High awareness but limited technical knowledge
Benefits	Competitive advantage, better customer satisfaction
Barriers	Cost, lack of expertise, infrastructure issues
Sustainability	Moderate awareness of environmental benefits

Managers recognized AR's potential but expressed concerns about **cost and implementation complexity**.

4.7 Integrated Findings

The integration of quantitative and qualitative findings reveals:

- Strong **consumer demand for AR experiences**
- Significant **industry hesitation due to barriers**
- A clear **gap between demand and adoption**

4.8 Discussion of Key Findings

The findings highlight that AR technology enhances both **functional utility and experiential engagement**. While perceived usefulness drives decision-making, enjoyment and interactivity play equally important roles.

Trust remains a critical factor, indicating the need for accurate and realistic AR representations.

4.9 Implications

For Hotels

- Adopt AR to increase booking conversions
- Focus on mobile-friendly solutions
- Use AR as a competitive differentiator

For Policymakers

- Provide subsidies and training programs
- Promote digital tourism initiatives

5. DISCUSSION

5.1 Theoretical Contributions

This study makes a substantial contribution to the evolving body of knowledge in hospitality and tourism technology by extending the applicability of the **Technology Acceptance Model (TAM)** proposed by Fred Davis within the context of augmented reality (AR)-driven room customization. While TAM has traditionally focused on perceived usefulness (PU) and perceived ease of use (PEOU) as the primary determinants of technology adoption, this research integrates additional experiential and psychological variables, including perceived enjoyment, trust, and customization, thereby offering a more comprehensive framework suited to experiential industries such as hospitality.

As outlined in the study , hospitality is inherently an experience-driven sector where emotional engagement, perceived value, and sensory interaction significantly influence consumer decision-making. The inclusion of perceived enjoyment as a key construct reflects the transition from purely utilitarian technology adoption models toward **experience-centric frameworks**. The findings clearly indicate that AR is not merely evaluated based on its functional benefits but also on its ability to provide immersive and engaging experiences. This aligns with contemporary tourism research, which emphasizes the growing importance of hedonic motivations in digital environments.

A critical theoretical advancement emerging from this study is the role of **psychological ownership** in shaping booking intentions. When users engage with AR-based room customization—such as modifying layouts, experimenting with lighting conditions, or exploring different viewing angles—they develop a sense of control and personal attachment to the space. This perceived ownership fosters emotional investment, reduces uncertainty, and enhances commitment toward booking decisions. The concept of psychological ownership thus acts as an underlying mechanism that bridges the gap between technological interaction and behavioral intention.Furthermore, the study highlights the importance of **trust as a central construct** in AR-based environments. While AR enhances transparency by offering detailed visualizations, it simultaneously

introduces concerns regarding authenticity and accuracy. Users may question whether the digitally enhanced representations truly reflect real-world conditions. This skepticism underscores the need to integrate trust into technology adoption models more explicitly. The findings suggest that trust not only influences direct booking intentions but also moderates the impact of perceived usefulness and enjoyment, thereby reinforcing its theoretical significance.

Another notable contribution is the demonstration of the **high explanatory power of the extended TAM framework**. The model explains approximately 68.4% of the variance in booking intention, which is significantly higher than traditional TAM applications that typically range between 40% and 55%. This indicates that incorporating experiential and emotional variables enhances the predictive capability of the model. It also reflects the changing nature of consumer behavior in digital hospitality contexts, where decisions are influenced by a combination of rational evaluation and emotional engagement.Additionally, this study contributes to the relatively underexplored domain of AR adoption in **emerging markets**, particularly in India. Much of the existing literature on AR and hospitality technology is centered on developed economies, where digital infrastructure and technological readiness are relatively advanced. By focusing on Uttar Pradesh, this research provides valuable insights into how regional factors—such as digital literacy, infrastructure limitations, and cost sensitivity—shape technology adoption. This contextual perspective enriches the global understanding of AR adoption and highlights the need for localized strategies.The integration of customization as a key variable also represents a significant theoretical contribution. Customization enhances user agency and interactivity, allowing individuals to tailor their experiences according to personal preferences. This aligns with the broader shift toward **personalized tourism experiences**, where consumers seek unique and tailored interactions rather than standardized offerings. By incorporating customization into the TAM framework, the study provides a more nuanced understanding of how personalization influences technology acceptance and behavioral outcomes.

The theoretical contributions of this study can be categorized into four key areas:

- Extension of TAM to include experiential and emotional variables
- Identification of psychological ownership as a mediating mechanism
- Emphasis on trust as a critical determinant in AR environments
- Contextualization of AR adoption within emerging tourism markets

These contributions collectively advance the theoretical discourse on technology adoption in hospitality and provide a foundation for future research exploring immersive technologies.

5.2 Practical Implications

The findings of this study offer significant practical implications for hotel managers, policymakers, and technology providers operating within Uttar Pradesh's hospitality ecosystem. As the tourism sector becomes increasingly competitive and digitally driven, the adoption of AR technologies presents both opportunities and challenges that must be strategically addressed.

5.2.1 Strategic Differentiation through AR

One of the most important practical implications is that AR can serve as a **strategic differentiator** in a highly competitive hospitality market. Hotels often compete on similar parameters such as pricing, location, and amenities, making it difficult to stand out. AR-driven room customization introduces a novel and engaging dimension to the booking process, enabling hotels to offer immersive experiences that capture customer attention and build trust.

By adopting AR technologies, hotels can position themselves as **innovative and forward-thinking**, thereby enhancing their brand image. This is particularly important for attracting younger, digitally savvy travelers who value interactive and technology-driven experiences. In a region like Uttar Pradesh, where tourism growth has intensified competition, AR can provide a critical edge in differentiating offerings.

5.2.2 Importance of Mobile-First AR Solutions

The study highlights the necessity of adopting a **mobile-first approach** to AR implementation. Given the widespread use of smartphones in India, mobile devices represent the primary platform through which travelers access hotel information and make booking decisions.

Mobile-based AR solutions offer several advantages:

- **Enhanced accessibility**, allowing users to interact with AR features anytime and anywhere
- **Cost-effectiveness**, as they eliminate the need for specialized hardware
- **User convenience**, aligning with existing digital behavior patterns

However, it is essential to ensure that AR applications are optimized for varying levels of internet connectivity, particularly in tier-2 and tier-3 cities. Lightweight, responsive, and user-friendly interfaces are crucial for maximizing adoption and engagement.

5.2.3 Cost Management and Collaborative Strategies

Despite its potential, AR adoption is often constrained by **financial and technical barriers**. Many hotels, particularly small and medium-sized enterprises, may find the initial investment required for AR development prohibitive.

To address these challenges, the study suggests several strategic approaches:

- **Collaborative development models**, where multiple hotels pool resources to share development costs
- **Partnerships with technology providers**, offering scalable and subscription-based AR solutions
- **Utilization of government support programs**, aimed at promoting digital transformation in tourism

These strategies can significantly reduce the financial burden and make AR adoption more feasible across different categories of hotels.

5.2.4 Training and Capacity Building

A recurring theme in the findings is the lack of technical expertise among hotel managers and staff. While awareness of AR technology is relatively high, the ability to implement and manage such systems remains limited.

This highlights the importance of capacity building and training initiatives, focusing on:

- Digital literacy and technology adoption
- AR content creation and management
- Customer experience design

By investing in training, hotels can bridge the gap between awareness and implementation, ensuring that AR technologies are effectively utilized.

5.2.5 Enhancing Customer Experience and Engagement

AR technologies have the potential to significantly enhance **customer experience**, which is a critical determinant of booking decisions and customer loyalty. By providing interactive and immersive previews, AR reduces uncertainty and builds confidence among potential guests.

Key benefits include:

- **Transparent visualization of rooms and amenities**, reducing expectation gaps
- **Personalized customization options**, enhancing user satisfaction
- **Interactive engagement**, increasing time spent on booking platforms

These factors collectively contribute to higher conversion rates and improved customer retention.

5.2.6 Bridging the Demand–Adoption Gap

An important insight from this study is the existence of a gap between **consumer readiness and industry adoption**. While customers demonstrate strong interest in AR-based experiences, many hotels remain hesitant due to perceived risks and challenges.

Bridging this gap requires a coordinated effort involving:

- Industry stakeholders
- Technology providers
- Government agencies

Such collaboration can create an enabling ecosystem that supports innovation while addressing practical constraints.

6. SUSTAINABILITY IMPLICATIONS

Sustainability has emerged as a central pillar in contemporary tourism and hospitality discourse, driven by increasing environmental concerns, resource constraints, and evolving consumer expectations. The transition toward sustainable tourism is no longer optional but imperative, particularly in regions experiencing rapid tourism growth such as Uttar Pradesh. Within this context, the integration of augmented reality (AR) technologies presents a promising pathway for aligning technological innovation with sustainability objectives.This study highlights that AR-driven room customization is not merely a marketing tool but also a **sustainability enabler**, contributing to environmental conservation, operational efficiency, and responsible consumer behavior. By transforming how information is delivered and experienced, AR reduces reliance on physical resources and minimizes unnecessary travel, thereby supporting the broader goals of sustainable tourism development.

6.1 Reduction of Physical Visits

One of the most significant sustainability contributions of AR lies in its ability to reduce unnecessary physical visits to hotel properties. Traditionally, prospective guests—particularly corporate clients, travel agents, or event planners—often engage in pre-booking site inspections to evaluate room quality, amenities, and spatial arrangements. While such visits provide assurance, they also generate substantial environmental costs, including fuel consumption, carbon emissions, and logistical resource use.

AR technology effectively replaces these physical inspections with immersive virtual experiences. Through interactive 3D visualization, potential guests can explore hotel rooms, adjust layouts, and assess facilities remotely with a high degree of realism. This shift from physical to digital interaction contributes to a measurable reduction in travel-related emissions.From a sustainability perspective, this aligns with global efforts to decarbonize tourism activities. Even small reductions in pre-booking travel can have a cumulative impact, particularly in high-volume destinations. For instance, in a state like Uttar Pradesh, which receives millions of visitors annually, minimizing even a fraction of inspection visits can lead to substantial environmental benefits.Moreover, the reduction of physical visits also alleviates pressure on local infrastructure, including transportation networks and urban congestion. This is particularly relevant in heritage cities such as Agra and Varanasi, where overtourism and environmental degradation are growing concerns. By enabling virtual engagement, AR contributes to

destination-level sustainability, balancing tourism growth with environmental preservation.

6.2 Minimization of Paper-Based Marketing

Another critical sustainability benefit of AR is its potential to significantly reduce reliance on paper-based marketing materials. The hospitality industry has traditionally depended on brochures, catalogs, flyers, and printed advertisements to showcase hotel offerings. While effective in earlier decades, these materials contribute to deforestation, waste generation, and increased carbon footprints associated with printing and distribution processes.

AR-driven digital platforms offer a compelling alternative by enabling **interactive and dynamic content delivery**. Instead of static images and printed descriptions, hotels can provide immersive visualizations that allow users to explore rooms and facilities in real time. This transition not only enhances customer engagement but also eliminates the need for large-scale printing.

The environmental benefits of this shift are multifaceted:

- **Lower paper consumption**, reducing demand for raw materials
- **Decreased printing-related emissions**, including energy and chemical usage
- **Reduction in physical waste**, particularly non-recyclable promotional materials

In addition to environmental advantages, the move toward digital marketing also offers economic benefits. Hotels can reduce costs associated with printing, storage, and distribution while maintaining up-to-date content through easily modifiable digital platforms.Furthermore, AR enables **content longevity and scalability**, allowing hotels to update information instantly without generating waste. This is particularly important in a dynamic industry where pricing, amenities, and services frequently change.

6.3 Resource Efficiency

Resource efficiency is a fundamental principle of sustainable hospitality, focusing on optimizing the use of energy, water, and human resources. AR contributes to this objective by enhancing the accuracy of customer expectations and reducing operational inefficiencies.One of the key challenges in hospitality is the mismatch between customer expectations and actual experiences. Guests often rely on limited or misleading information when booking rooms, leading to dissatisfaction upon arrival. This frequently results in room changes, additional housekeeping tasks, and increased consumption of resources such as water, electricity, and cleaning supplies.AR addresses this issue by providing **transparent and detailed visualizations** of hotel rooms. When guests have a clear understanding of what to expect, the likelihood of dissatisfaction and subsequent changes is significantly reduced. This leads to several sustainability outcomes:

- **Reduced housekeeping workload**, minimizing labor and resource usage
- **Lower energy consumption**, as fewer rooms require additional preparation
- **Decreased water usage**, particularly in cleaning and maintenance processes

Additionally, AR can support **operational planning and inventory management**. By analyzing user interactions with AR features, hotels can gain insights into customer preferences and optimize room allocation accordingly. This data-driven approach enhances efficiency and reduces waste.

From a broader perspective, AR contributes to the concept of **smart hospitality**, where technology is used to optimize operations and minimize environmental impact. By integrating AR with other digital systems, hotels can create a more efficient and sustainable operational ecosystem.

6.4 Alignment with National Policies

The adoption of AR technologies aligns closely with India's national policies and strategic initiatives aimed at promoting sustainable tourism and digital transformation. The Government of India has increasingly emphasized the integration of technology in tourism through initiatives such as Digital India, Smart Cities Mission, and sustainable tourism frameworks.

These policies prioritize:

- **Smart tourism solutions** that enhance visitor experiences
- **Digital infrastructure development** to support innovation
- **Eco-friendly practices** to minimize environmental impact

AR fits seamlessly within this policy landscape by combining technological advancement with sustainability objectives. It enables destinations and hospitality providers to showcase their offerings in innovative ways while reducing environmental footprints.In the context of Uttar Pradesh, state-level tourism strategies also emphasize digital transformation and sustainable development. The integration of AR into hotel operations supports these goals by:

- Enhancing destination competitiveness
- Promoting eco-friendly practices
- Encouraging digital adoption among small and medium enterprises

Furthermore, AR can be integrated into broader tourism ecosystems, including heritage site interpretation, cultural

storytelling, and visitor management. This creates opportunities for **holistic sustainable tourism development**, where technology enhances both economic and environmental outcomes.

6.5 Promoting Responsible Consumption

A critical dimension of sustainability is the promotion of responsible consumption behavior among tourists. AR contributes to this objective by enabling **informed decision-making**, reducing uncertainty, and aligning customer expectations with actual experiences.When travelers have access to accurate and immersive information, they are more likely to make choices that align with their preferences and needs. This reduces the likelihood of dissatisfaction, cancellations, and resource wastage. For example, guests who clearly understand room size, layout, and amenities are less likely to request changes or upgrades upon arrival.

AR also encourages **mindful consumption** by allowing users to explore multiple options before making a decision. This reduces impulsive bookings and promotes thoughtful selection of accommodations.

Additionally, AR can be used to educate travelers about sustainability practices within hotels. For instance, interactive features can highlight:

- Energy-saving initiatives
- Waste management practices
- Local sourcing of materials and services

By integrating such information into AR experiences, hotels can raise awareness and encourage environmentally responsible behavior among guests.

6.6 Broader Sustainability Impacts

Beyond the immediate benefits, AR has the potential to contribute to broader sustainability outcomes in the hospitality sector.

6.6.1 Reduction of Overtourism Pressure

By enabling virtual exploration, AR can help distribute tourist demand more evenly across destinations. Travelers can explore multiple options digitally, reducing pressure on overcrowded areas and promoting lesser-known destinations.

6.6.2 Support for Local Economies

AR can be used to showcase local culture, crafts, and heritage within hotel environments. This promotes local products and services, contributing to community-based tourism and economic sustainability.

6.6.3 Integration with Smart Tourism Ecosystems

AR can be integrated with other smart technologies such as artificial intelligence and the Internet of Things (IoT) to create intelligent and sustainable tourism systems. These systems optimize resource use, enhance visitor experiences, and support sustainable development goals.

6.7 Challenges and Considerations

While AR offers significant sustainability benefits, its implementation is not without challenges. These include:

- **Energy consumption of digital systems**, which must be managed efficiently
- **Initial resource investment**, including hardware and software development
- **Digital divide issues**, particularly in regions with limited internet access

Addressing these challenges requires a balanced approach that considers both technological and environmental factors.

7. CONCLUSION

This study provides compelling evidence that **augmented reality-driven room customization significantly enhances hotel booking intentions**, particularly in the context of Uttar Pradesh's rapidly evolving tourism industry. By integrating both functional and experiential dimensions, AR technologies transform the traditional booking process into an interactive and engaging experience.The findings highlight that **perceived usefulness, enjoyment, and ease of use** are key drivers of AR adoption, while trust remains an important moderating factor. The extended TAM framework demonstrates strong explanatory power, reinforcing its relevance in emerging technology contexts.From a practical perspective, AR represents a **strategic investment opportunity** for hotels seeking to differentiate themselves in a competitive market. While challenges such as cost, technical expertise, and infrastructure limitations persist, the long-term benefits of AR adoption—including increased bookings, enhanced customer satisfaction, and improved operational efficiency—outweigh these barriers.The study also underscores the importance of **policy support and industry collaboration** in facilitating widespread adoption. Government initiatives promoting digital tourism, combined with industry partnerships, can create an enabling environment for AR implementation.Importantly, AR contributes to the broader goal of **sustainable tourism development** by reducing environmental impact, enhancing resource efficiency, and promoting responsible consumption. This positions AR not only as a technological innovation but also as a tool for achieving sustainability objectives.

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