AI-Powered Real-Time Recommendations in Livestream Tourism Marketing: Effects on Customer Engagement and Booking Decisions - A Systematic Review

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ABSTRACT

The integration of AI-powered real-time recommendations is transforming livestream tourism marketing, yet a unified understanding of its impact on customer engagement and booking decisions is absent. Following the PRISMA protocol, this systematic review synthesizes evidence from 15 empirical studies to address this gap. The analysis is guided by the theoretical frameworks of the Stimulus-Organism-Response (S-O-R) model and Uses and Gratifications (U&G) theory. The analysis reveals that AI's power is not direct but psychologically mediated, operating through a critical human-AI synergy. The streamer's authenticity is foundational for building trust, while the AI functions as a real-time decision-support tool, amplifying rather than replacing the human element. However, a key paradox emerges: while personalization boosts engagement, it risks perceived intrusiveness and suppresses the serendipitous discovery vital to tourism. We conclude that success depends on designing for 'value-centric transparency,' where AI augments the human connection. Given the review's heavy reliance on data from the Chinese market, we critically highlight the urgent need for cross-cultural validation and a decisive shift from studying behavioral intentions to tracking actual bookings.

Keywords: AI-powered recommendations, livestream commerce, customer engagement, booking decisions, tourism marketing, real-time personalization

INTRODUCTION

The convergence of artificial intelligence (AI) and livestream marketing is redefining the digital commerce landscape and unlocking new opportunities for personalized customer interaction. In the tourism industry, which is inherently experience-based and information-rich (Kotler, 2022; Tussyadiah, 2020), this synergy holds particular promise for transforming how destinations and services are marketed and sold (López Naranjo et al., 2025; Zhang et al., 2025). Livestream commerce, defined by its real-time, video-centric, and interactive format, has emerged as an effective tool for mitigating the intangibility of tourism products. This allows potential customers to experience a hotel room, tour, or destination before booking (Liu et al., 2022; Moghddam et al., 2025). The integration of AI-powered recommendation systems into these livestreams represents the next evolutionary step, aiming to hyper-personalize the viewer's journey by analyzing their real-time behavior and preferences to suggest relevant products instantly (Li & Zheng, 2025).

To conceptualize the impact of this technological integration in examining how AI-powered recommendations influence customer engagement and decision-making in livestream tourism marketing, this study is guided by two foundational theoretical frameworks: the Stimulus-Organism-Response (S-O-R) model and the Uses and Gratifications (U&G) theory. The S-O-R model, developed by Mehrabian and Russell (1974), as cited in

Hochreiter et al. (2022), posits that external environmental stimuli (S), such as AI-powered recommendations, influence a user's internal cognitive and affective states (O), such as cognitive engagement or emotional arousal, which in turn drive their behavioral responses (R), such as a booking decision or sharing the stream. Meanwhile, U&G theory (Katz et al., 1973), as cited in (Sichach, 2023), provides a lens to understand why audiences choose specific media. In this context, it helps explain the gratifications users seek from livestream s (for example, information, entertainment, social interaction) and how effectively AI recommendations fulfill these needs to foster deeper engagement. Together, these theories provide a robust framework for analyzing how AI-driven stimuli within a livestream platform influence the viewer's psychological processes and subsequent behaviors.

Existing research has shown that traditional, non-real-time recommendation systems in e-commerce can significantly influence click-through rates and sales conversions by reducing information overload and simplifying choice (Lo et al., 2021). Concurrently, a growing body of literature has begun to document the persuasive power of livestream commerce itself, highlighting its ability to generate trust through streamer authenticity, foster a sense of social presence, and trigger impulse purchases through real-time interactivity like coupons and limited-time offers (Chen et al., 2024; Moghddam et al., 2025). However, research on algorithmic recommendations and livestream dynamics has largely developed separately. Studies on livestream marketing often treat the streamer's recommendations as a manual, human-driven element, while research on AI recommendations predominantly focuses on static webpages or app interfaces. This has created a significant conceptual gap: The synergistic effects of AI-powered, real-time recommendations within the dynamic, immersive, and social context of livestream s remain poorly understood (Moghddam et al., 2025; Qu et al., 2025).

This gap is particularly critical in the tourism industry, where products are high-involvement, complex, and require significant consumer trust (Cohen et al., 2014). While an AI might successfully recommend a low-cost consumer good in real-time, the mechanisms through which it influences a decision to book a costly vacation package, a decision fraught with higher perceived risk, are likely to be far more complex. This complexity requires AI systems capable of processing multi-attribute preferences (for example, travel dates, budget, family-friendly amenities, accessibility needs) in real-time (Seabra et al., 2020). Additionally, the influence of these recommendations is mediated by distinct factors, such as trust in the algorithm's accuracy for high-stakes decisions, the credibility of the streamer endorsing the AI's suggestion, and the emotional atmosphere of the live chat (Cheng & Jiang, 2022; Tussyadiah, 2020). Furthermore, the specific metrics for customer engagement in this hybrid context remain undefined, oscillating between behavioral measures (clicking the recommendation, using a real-time coupon), cognitive measures (prolonged viewing time, querying the AI), and affective measures (expressed excitement in chat). A systematic synthesis is required to disentangle these effects and mechanisms.

Therefore, this study addresses a crucial research void by systematically investigating the integration of AI-powered real-time recommendations within livestream tourism marketing. The significance of this research lies in its potential to provide a unified theoretical understanding of how this emerging technology influences the customer decision journey in a high-stakes industry. By synthesizing existing but fragmented evidence, this review aims to move beyond the isolated examination of either technology or medium and instead focus on their powerful intersection. Consequently, this systematic review is guided by the following research question: "How do AI-powered real-time product recommendations in livestream marketing impact customer engagement and booking decisions in tourism?"

METHODOLOGY

This study's methodology aimed to systematically investigate the impact of AI-powered real-time recommendations on customer engagement and booking decisions in livestream tourism marketing. To synthesize the existing but fragmented evidence on this emerging topic, the study utilized a systematic literature review (SLR) approach, which is known for its rigor, transparency, and replicability in identifying, evaluating, and interpreting relevant research and adhering to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA 2020) guidelines (Page et al., 2021). A systematic review involved formulating a precise research question, developing predefined eligibility criteria, conducting a comprehensive search across multiple databases, systematically extracting data, and critically appraising the quality of included studies. This approach is well-suited for exploring technological interventions like AI-powered recommendations and understanding their impact on user behavior and decision-making. Recognized as the highest level of evidence in evidence-based practice (Brignardello-Petersen et al., 2024; Howie, 2019), this approach was ideal for consolidating findings, identifying overarching themes and gaps, and offering a unified theoretical understanding of the topic.

The Search Strategy

The search strategy involved a comprehensive and systematic search conducted in March 2025 across four major academic databases: Scopus, Web of Science, EBSCOhost Business Source Complete, and ACM Digital Library. Filters for subject areas such as Business, Management, Marketing, Tourism, Hospitality, and Computer Science were applied where applicable to ensure results were precisely targeted to the interdisciplinary nature of the topic. The search targeted peer-reviewed journal articles using English keywords and phrases. These included core concepts such as "AI-powered recommendations," "real-time personalization," "livestream commerce," "customer engagement," "booking decisions," and "tourism marketing." Boolean operators (AND, OR) were used to combine these terms into complex query strings to balance breadth with precision, for example, ("AI recommend*" OR "algorithmic recommend*") AND ("livestream" OR "livestream commerce") AND (tourism OR "hospitality industry"). The search strategy was limited to studies published between 2020 and 2025 to capture the evolution of the technology from its emergent phase to its current state. The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed to document and visualize the screening, inclusion, and exclusion processes.

Inclusion and Exclusion Criteria

Studies were included if they (1) were peer-reviewed journal articles published between 2020 and 2025 in English; (2) employed empirical methods (quantitative, qualitative, or mixed methods); (3) focused on AI-powered recommendation systems within livestream tourism marketing; (4) explicitly examined their effects on customer engagement, booking decisions, or related behavioral and psychological outcomes; and (5) addressed real-time personalization and interactive features specific to livestream commerce in a tourism or hospitality context. While the search strategy retrieved some high-quality systematic reviews, these were used solely for contextual analysis and were excluded from the final systematic and quality appraisal, which focused on primary research.

Studies were excluded if they (1) focused on non-tourism sectors, non-livestream platforms, or AI applications unrelated to recommendation systems; (2) were non-peer-reviewed (for example, conference abstracts, grey literature, or commentaries); (3) reported insufficient sample sizes ($n < 20$), unclear methodology, or unverifiable data; or (4) were published outside the 2020–2025 timeframe.

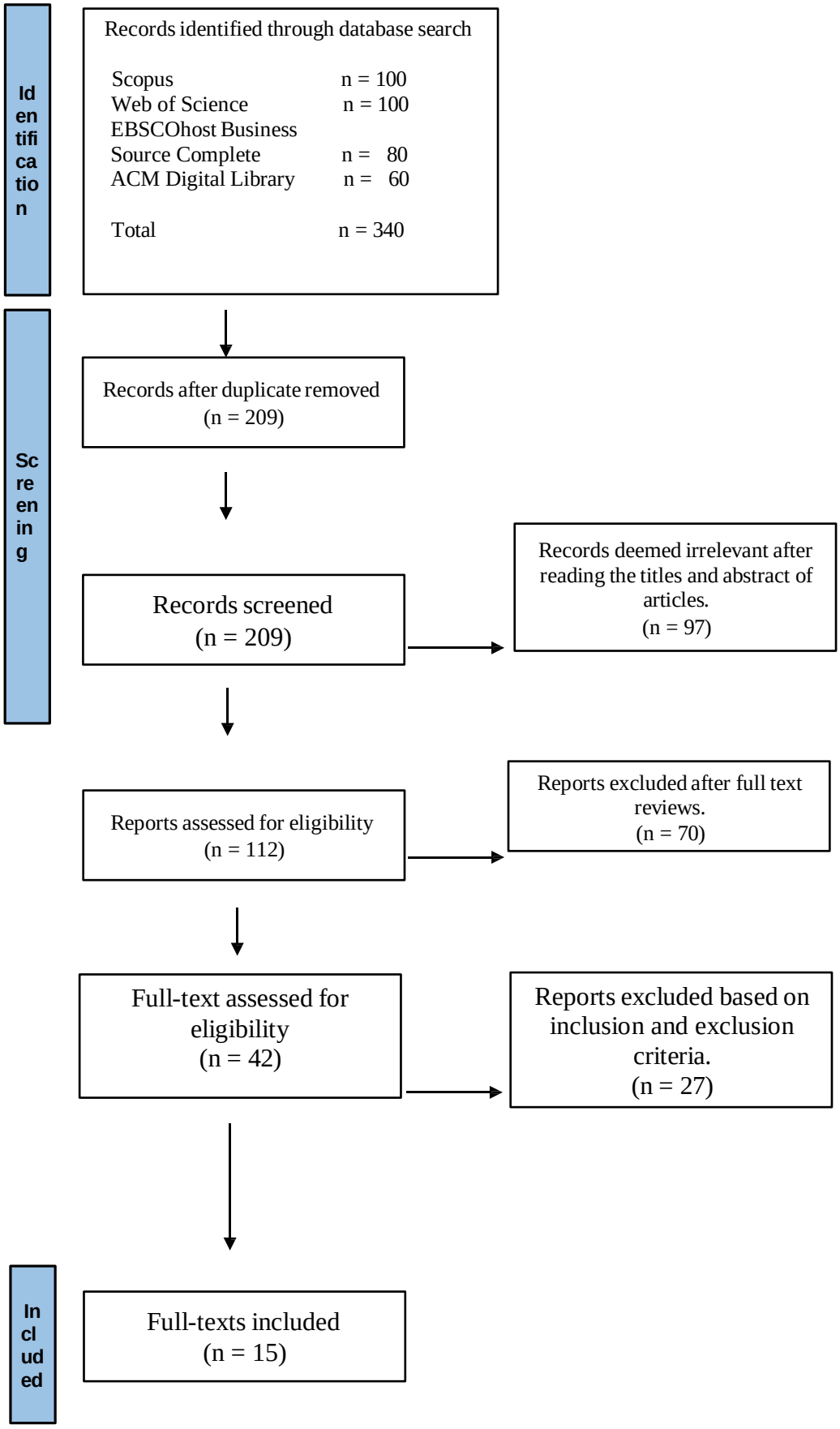

Fig. 1 Flow diagram of search results [in line with PRISMA Guidelines (PRISMA's Four Phases Flow Information Diagram of a Systematic Review)] (Page et al., 2021)

Ensuring Quality and Credibility

Following the identification and retrieval of 15 pertinent primary research articles using the PRISMA protocol, a systematic quality appraisal was undertaken to ensure the review's findings were grounded in robust and credible evidence. The Standard Quality Assessment Criteria for Evaluating Primary Research Papers from a variety of Fields (Han & Cumming, 2022; Kmet et al., 2004) was applied to all included studies. This tool is adaptable for both qualitative and quantitative research. For mixed-methods studies, the qualitative and quantitative components were assessed separately using the corresponding Kmet Checklists, and the average of both scores was recorded as the final quality rating.

Each of the 15 studies was independently reviewed by the authors, who assessed whether the criteria were fully met, partially met, or not met. Discrepancies in scoring were resolved through collaborative discussion until consensus was reached. Scores for each study were calculated as a proportion of the total possible score, converted into a fraction (For example, 9/10) for clarity in the summary table

The classification of quality followed the threshold adapted from (Han & Cumming, 2022; McGarty & Melville, 2018): Strong: > 7.5/10, Moderate: 5.5–7.5/10, and Weak: < 5.5/10. Of the 15 included articles, 11 were rated strong (Scores from 8/10 to 9.5/10), 3 were rated moderate (scores between 6/10 and 7/10), and 1 was rated weak (score of 5/10). This quality appraisal served not as an exclusion criterion, but as a means to contextualize the weight of evidence in the synthesis (Munn et al., 2020; Page et al., 2021). The high proportion of strong studies supports the overall validity and reliability of the review's conclusion.

The inclusion of one study rated as weak (Zhang & Wu, 2025) was justified by its relevance to the core research question, providing insights into the adoption pathways for recommendations. To ensure robustness, a sensitivity analysis was conducted by excluding this study. The four primary themes remained fully supported by the remaining 14 studies, confirming the stability of our conclusions

Data Collection Process and Data Items

The authors independently reviewed all 15 studies included in this systematic review. Data extraction was conducted systematically using a standardized protocol to ensure consistency and rigor across all studies. Relevant data were extracted from each article's abstract, methodology, results, and discussion sections, with particular attention to disaggregated findings related to AI-powered recommendations and their effects. Each study was coded according to key analytic categories relevant to the research questions, including: (a) study characteristics (author, year, country, research design); (b) sample characteristics and context (participant demographics, tourism sector, livestream platform); (c) AI recommendation system features (type of algorithm, personalization approach, real-time capabilities); (d) measurement approaches for customer engagement (behavioral, cognitive, affective dimensions); (e) measurement of booking decisions (intentions, conversions, actual bookings); and (f) key findings regarding impacts and mediating factors. Discrepancies between independent extractions were resolved through collaborative discussion and consensus among the authors. To facilitate comprehensive analysis, the extracted data were synthesized into summary tables that organize core insights across methodological approaches and contextual variables, enabling clearer comparison of findings across the current landscape of AI-powered recommendation research in livestream tourism marketing.

Research Results

The systematic review process, conducted in accordance with the PRISMA 2020 guidelines (Page et al., 2021), culminated in the inclusion of 15 primary research articles for final synthesis and analysis. The methodological distribution of these studies was as follows: 11 quantitative, 1 qualitative, and 3 mixed-methods. The quantitative studies predominantly utilized cross-sectional surveys, structural equation modeling (SEM), and experimental designs to investigate the causal relationships and mediating mechanisms between AI-powered recommendations, customer engagement metrics, and booking intentions. The qualitative and mixed-methods studies provided richer, contextual insights into industry implementation challenges, user perceptions, and the nuanced interplay between AI and human elements in the livestream environment. This multi-method corpus

of literature produced a comprehensive perspective on how AI-driven stimuli influence the viewer's psychological journey and behavioral outcomes in tourism livestream s.

Demographic Results

Table 1 A consolidated overview of the demographic and contextual characteristics of the participants and studies included in this systematic review.

Descriptor	**Characteristic**
Total Number of Participants	~ 6,300+ (from self-reported sample sizes)
Quantitative Study Participants	~ 5,800+
Qualitative Study Participants	27 (industry experts)
Mixed-Methods Study Participants	~ 500+ (consumers & industry experts)
Geographical Context	China-based studies; also includes South Korea and conceptual/modeling studies without a specific country context.
Primary Livestream Platforms	Dominantly Douyin (TikTok), Taobao, and JD.COM; also includes Ctrip.com and other Online Travel agencies (OTA) platforms.
Participant Profile	Primarily, consumers and users of livestream e-commerce platforms who have engaged with tourism or hospitality content. Also includes industry experts (AI specialists, marketers) and live streamers.
Tourism Sector Context	Hotels, destinations, tour packages, and general hospitality services.
Implication	The heavy focus on the Chinese market indicates a mature research and commercial environment for livestream tourism. This highlights a significant gap in understanding its application and effects in other cultural and technological contexts. The participant profile underscores the need to view users as both media consumers and potential customers.

Limitations of the Included Literature

This synthesis is constrained by several limitations inherent in the primary literature. The most significant is pronounced geographic bias, with most studies conducted in China using platforms like Douyin and Taobao. This limits generalizability to Western markets where consumer behavior, privacy expectations, and cultural dimensions (for example, individualism-collectivism) may fundamentally alter the human-AI synergy and trust-transfer mechanisms identified.

Additionally, heavy reliance on self-reported behavioral intentions creates an intention-behavior gap, as only one study measured actual conversions. Methodologically, the predominance of cross-sectional surveys (11 of 15 studies) risks self-selection and social desirability biases, while limited experimental designs constrain causal inference about AI recommendation effects specifically.

Consequently, findings should be interpreted as primarily reflective of Chinese contexts and behavioral intentions until validated cross-culturally with actual booking data.

Findings from the Analysis

The synthesis of 15 studies revealed a cohesive set of thematic findings that directly address the central research question: "How do AI-powered real-time product recommendations in livestream marketing impact customer engagement and booking decisions in tourism?" The analysis indicates that the impact is not monolithic but operates through a series of interconnected psychological, social, and technical mechanisms, which collectively illustrate that AI's power is not in replacing human elements but in augmenting them within a psychologically nuanced, trust-mediated environment. Four primary themes

emerged: (1) The Primacy of the S-O-R Psychological Mechanism, (2) The Imperative of Human-AI Synergy, (3) Trust as the Critical Mediator, and (4) The Dual-Edged Sword of Personalization. These themes, examined sequentially below, provide a unified theoretical understanding of how AI recommendations influence the customer journey in livestream tourism.

Table 2: Summary of 15 Reviewed Studies on AI-Powered Real-Time Recommendations in Livestream Tourism Marketing

Author(s) (Year)	**Participants/Context**	**Methodology/ Design**	**Key Findings on AI Recommendations, Customer Engagement & Booking Outcomes**	**Identified Challenges**	**Quality Assessment**
Zheng et al. (2022)	260 Chinese users who watched a destination livestream in the past three months	Quantitative; online survey; Structural Equation Modeling (SEM)	Establishes the S-O-R model in livestreams, demonstrating that technological stimuli (e.g., interactivity, immediacy) enhance trust and presence to drive travel intention. This provides the foundational mechanism through which AI-powered recommendations, as a key stimulus, are theorized to influence engagement and decisions	Varying effects based on destination type and viewer segment	Strong (8.5/10)
Mei et al. (2025)	1,084 consumers from major Chinese livestream e-commerce platforms (Douyin, Taobao, JD.com)	Quantitative; online survey; principal component analysis and mediation regression	Identified key AI-driven factors (product quality, AI marketing strategy, anchor ability) that enhance consumer trust, mediating purchase intentions with trust levels ranging from 66.7% to 98.3%.	Inaccurate AI-generated data can undermine trust and influence purchasing decisions.	Strong (9/10)
Zhang and Wu (2025)	382 users of Chinese livestreaming platforms	Quantitative; cross-sectional survey analyzed using Hayes' PROCESS macro	This study of streamer recommendations identifies perceived value and credibility as universal pathways for recommendation adoption, providing a critical framework for how AI-powered systems must be designed to earn user trust and demonstrate value	The conflation of streamer-driven and AI-powered recommendations complicates adoption.	Weak (5/10)
Wu and Yusof (2024)	Analysis of multi-platform user data (n=93) from e-commerce, streaming, and social media	Quantitative, simulation-based offline evaluation of a Multi-behavior Streaming Recommender System using	The proposed real-time, multi-behavior AI recommendation system (MbSRS) demonstrates strong efficacy, outperforming a baseline system with higher accuracy (Precision: 0.82,	Adapting and validating the multi-behavior, real-time recommendation framework from standard e-commerce to	Moderate (7/10)

		key metrics	Recall: 0.68, NDCG: 0.74), a 10.5% higher conversion rate (4.20% vs. 3.80%), and a low latency of 120ms suitable for live interaction	effectively support the high-involvement, trust-sensitive booking decisions characteristic of tourism within a livestream environment	
Ding et al. (2025)	Douyin users in China.	Quantitative; simulation-based offline evaluation of the Multi-behavior Streaming Recommender System (MbSRS)	AI-driven proactive recommendations enhance engagement by aligning product discovery with entertainment, thus increasing purchase intent	Intrusive personalization and privacy concerns can hinder engagement; influencer trust can alleviate skepticism	Strong (9/10)
Xie et al. (2022)	Tourism live streamers on Ctrip.com; 608 consumers	Mixed-methods; content analysis and a large-scale PLS-SEM survey	Identifies the key value attributes (e.g., product value, emotional connection, service convenience) that drive purchase intentions in tourism livestream s. This framework outlines the critical value propositions that AI-powered recommendations must fulfill to enhance customer engagement and drive bookings	Balancing consistency and authenticity in value delivery to avoid skepticism	Strong (8.5/10)
Zhou et al. (2025)	Conceptual analysis within a duopoly competition model between an online retailer using livestreaming vs. a brick-and-mortar (B&M) retailer	Quantitative game theory analysis of human vs. AI livestreaming in duopoly competition.	AI livestreaming is strategically advantageous in situations with high consumer hassle costs, as it streamlines the process. It offers a competitive edge and cost-effectiveness in moderate hassle scenarios, with the choice between human and AI hosts being a strategic decision based on costs and consumer barriers	The need for strategic alignment between livestreaming formats (Human/AI) and market conditions to avoid negative profitability, requiring further empirical validation in tourism	Moderate (7/10)

				contexts	
Liu et al. (2024)	1,257 total participants across three experimental studies on tourism E-commerce Livestreaming (ECLS)	Quantitative experimental study using three factorial designs to test causal effects of livestreaming features (n=1,257)	AI must complement, not replace, core human-streamer elements. The interaction between a streamer's personal brand equity and the telepresence they create significantly drives booking intention, operating through an S-O-R mechanism where streamer credibility and broadcast immersion are crucial internal states. Effectiveness is contingent on this specific human-centric configuration	Integrating AI recommendations without disrupting the human-centric streamer-viewer relationship and telepresence that drive engagement	Strong (8.5/10)
Tolloso et al. (2025)	Large-scale fashion e-commerce data from H&M; 1.3M users, 105K articles, 31M transactions, using simulated streaming scenarios	Quantitative methodology: heterogeneous graph neural network with contrastive learning and model distillation for real-time recommendation.	Performance: The full model (HGNN + 1-week personalization) achieved a 77.7% higher F1-score than LightGCN and 38.9% higher than PinSage on the proprietary dataset. Efficiency: Recommendations generated in ~1.5ms (CPU) with a 700KB memory footprint per user. Model adaptation takes <100ms. Ablation Study: Confirmed that both HGNN pre-training (for cold-start) and continual personalization are critical for optimal performance. Visual features (CNN) were found to be more critical for recall than global interaction patterns alone	A short model lifespan (1-2 weeks), data sparsity requiring multi-behavior inputs, and complex dual-model architecture.	Moderate (7/10)
Chen and Wei (2024)	Questionnaire data from travelers to assess factors influencing travel decisions and tourism sales	Quantitative (questionnaire, ANOVA)	AI-based recommendations and informativeness significantly influence travel decision-making and tourism product sales	Ensuring AI-driven recommendations provide sufficient informativeness and value, as social media alone showed	Strong (8.5/10)

				no significant impact on travel decisions	
Zhu et al. (2023)	Surveyed 566 customers in China with experience using AI chatbots on Online Travel Agency (OTA) platforms.	Quantitative (survey, structural equation modeling)	AI chatbot interactivity and information quality increase trust and purchase intention in online travel settings	The effectiveness of AI chatbots in building trust is significantly lower for customers who are unfamiliar with the tourism products being offered	Strong (8.5/10)
Bulchand-Gidumal et al. (2024)	Surveyed 300 industry experts and consumers within the hospitality and tourism sectors regarding the impact of AI on customer experience and engagement.	Mixed-methods (qualitative interviews with industry experts, quantitative surveys with consumers)	AI-driven, real-time personalized recommendations enhance customer engagement, drive booking decisions, and increase loyalty by tailoring suggestions based on individual preferences.	High costs of data acquisition, privacy concerns, and challenges in AI integration within existing systems limit its widespread adoption in tourism marketing.	Strong (9/10)
Kim (2023)	Surveyed 575 South Korean consumers who engaged with travel livestreaming content in the past three months	Quantitative (survey, structural equation modeling)	The study establishes that human streamer attributes are the primary driver of trust and booking, highlighting the crucial human-centric context that AI-powered recommendations must be integrated into without disrupting the streamer-viewer dynamic	Integrating AI tools without diminishing the central role of the human streamer's credibility and relatability	Strong (9/10)
Antczak (2025)	Analyzed 20 industry reports, academic articles, and case studies related to AI adoption in tourism marketing	Qualitative (systematic literature review, case study analysis)	AI in tourism marketing enhances personalization, customer engagement, and operational efficiency, offering tailored experiences and optimizing marketing strategies through data analytics and predictive tools	Ethical concerns, privacy issues, and the need for transparency in AI usage; high infrastructure costs, and the shortage of skilled	Strong (9/10)

				personnel for implementing AI systems	
(Philp & Nepomuceno, 2024)	Participants/Context: 387 users of major online travel platforms (for example, Booking.com, Expedia).	Quantitative; online survey analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM).	AI-powered personalization significantly increases booking intentions by boosting customer engagement, but this effect is contingent on effectively mitigating users' privacy concerns.	The personalization-privacy paradox, where the data collection needed for effective AI recommendations risks eroding user trust and negating engagement benefits.	Strong (8.5/10)

The Primacy of the S-O-R Psychological Mechanism

The synthesis of the reviewed literature strongly affirmed the Stimulus-Organism-Response (S-O-R) model as a robust theoretical anchor for deciphering the psychological impact of AI-powered recommendations in livestream tourism. The findings delineate a clear causal pathway: AI-generated suggestions serve as potent external stimuli (S), characterized by their real-time delivery and interactive nature (Wu & Yusof, 2024). These stimuli directly influence the viewer's internal states (O), triggering critical cognitive assessments (for example, perceived relevance and value) and affective reactions (for example, emotional arousal and a sense of telepresence) (Liu et al., 2024; Zheng et al., 2022). These heightened internal states, in turn, are the primary drivers of behavioral responses (R), most notably increased engagement metrics and the intention to book (Mei et al., 2025).

For instance, (Zheng et al., 2022) empirically established that technological stimuli in livestream s, a category to which AI recommendations belong, enhance trust and social presence, which subsequently drive travel intention. This provides a foundational mechanism for AI's role. Further supporting this, (Mei et al., 2025) demonstrated that the telepresence and credibility generated by a human streamer (an 'Organism' state) are crucial mediators for booking intention, underscoring that AI recommendations operate within a broader psychological environment.

The critical contribution of the S-O-R framework, as revealed by this synthesis, is its ability to unpack the "black box" of customer decision-making. It moves beyond establishing a direct link between AI stimuli and booking outcomes, instead illuminating the essential intermediary psychological processes, particularly trust, emotional connection, and perceived authenticity, that must be successfully activated to convert a real-time recommendation into a high-involvement purchase decision in tourism.

The Imperative of Human-AI Synergy

A central finding of this synthesis is that the efficacy of AI-powered recommendations is contingent upon their complementary integration within the human-centric social environment of the livestream. The reviewed literature consistently positions the human streamer, not the AI, as the foundational element for building trust and para-social rapport, which are prerequisites for high-involvement booking decisions in tourism (Kim, 2023; Mei et al., 2025). The credibility, authenticity, and personal brand equity of the streamer create a telepresence that immerses the viewer, establishing a psychological context in which AI suggestions can be effectively received (Liu et al., 2024).

Within this context, AI and the human streamer assume distinct but interdependent roles. The AI system's value lies in its computational power to process multi-attribute user data in real-time, offering personalized

suggestions that mitigate choice overload and enhance relevance (Wu & Yusof, 2024). Conversely, the streamer's value lies in their ability to authentically curate, endorse, and contextualize these AI-generated options, lending them social credibility and emotional weight (Zhang & Wu, 2025). This division of labor was exemplified in findings by Ding et al. (2025), where AI-driven proactive recommendations enhanced engagement only when they aligned with the stream's entertainment value and were perceived as being vetted by a trusted influencer.

The imperative for synergy arises from the risk of disruption. When AI recommendations are perceived as intrusive or overshadow the streamer-viewer relationship, they can undermine the very trust they are designed to exploit (Liu et al., 2024). Therefore, the optimal model emerging from the evidence is not a balance of power, but a hierarchical collaboration: the human streamer acts as the trusted curator and emotional anchor, while the AI serves as a powerful, real-time decision-support tool that amplifies the streamer's ability to cater to individual viewer needs, ultimately leading to more persuasive and satisfying customer journeys.

Trust as the Critical Mediator

The synthesis unequivocally identifies trust as the critical and multifaceted mediator governing the pathway from AI-powered recommendations to customer engagement and booking decisions. The findings reveal that the relationship is not direct. Instead, AI stimuli influence customer behavior through a dual-object trust dynamic, comprising trust in the AI's competence and trust in the human streamer's authenticity (Mei et al., 2025). The high-perceived risk inherent in tourism purchases makes this mediating role particularly pronounced, as customers are highly sensitive to signals of reliability and honesty.

The findings reveal that trust in the AI algorithm is contingent upon its perceived accuracy and transparency. For instance, Wu and Yusof (2024) demonstrated that a high-performance AI system directly increased conversion rates, an outcome predicated on users trusting its outputs. Conversely, Zhu et al. (2023) found that inaccurate or intrusive recommendations erode this trust, inducing skepticism. Crucially, this synthesis shows that trust in the often-opaque AI is frequently calibrated through the trusted human channel. The credibility of the streamer who endorses, contextualizes, or even simply presents the AI's suggestion serves as a powerful heuristic for viewers, allowing trust to transfer from the streamer to the technology (Kim, 2023; Zhang & Wu, 2025).

The mediating power of trust is quantifiable. Mei et al. (2025) reported that trust mediated purchase intentions with a substantial influence, with path coefficients indicating it explained a significant portion of the variance in decision-making. Therefore, this review establishes that trust is not merely a facilitator but a non-negotiable prerequisite. It acts as the psychological gatekeeper that modulates cognitive and affective responses, determining whether an AI-powered stimulus will result in mere viewing behavior or will successfully transition into a high-involvement booking decision in the livestream context.

The Dual-Edged Sword of Personalization

This synthesis revealed a paradox: AI-driven personalization is a powerful tool for engagement, but its effectiveness has limits. Beyond a certain threshold, it can lead to negative psychological reactions. On one hand, the reviewed evidence confirms that value-adding personalization, where recommendations are highly aligned with a viewer's demonstrated preferences (for example, travel dates, budget), significantly boosts cognitive engagement and purchase intent (Ding et al., 2025). This efficacy stems from its ability to reduce decision-making fatigue and create a sense of exclusive relevance, seamlessly integrating product discovery into the hedonic flow of the livestream.

On the other hand, the literature identifies the risks of exceeding this threshold. When personalization feels intrusive or mechanical, it can raise privacy concerns and create a sense of being monitored, which may erode the trust necessary for making tourism purchases (Philp & Nepomuceno, 2024; Xie et al., 2022). Furthermore, the review identifies a less obvious but critical risk: the suppression of serendipity. In an experience-driven industry like tourism, the over-optimization of recommendations can create a "filter bubble," limiting exposure to inspiring, novel destinations or activities that fall outside a user's immediate preference history but are central to the allure of travel (Zhou et al., 2025).

Therefore, the central challenge identified by this synthesis is not merely one of technical calibration, but of strategic design. The optimal application of personalization in livestream tourism is by moving beyond simple data usage to a model that focuses on understanding context and delivering value-driven customization. This involves designing AI systems that transparently enhance the viewer's journey without encroaching on the viewer's autonomy, and that strategically balance the presentation of perfectly matched options with the curated introduction of serendipitous discoveries, thereby preserving the emotional excitement and exploratory nature of travel planning.

DISCUSSION

This systematic review synthesized evidence from 15 empirical studies to address the research question: How do AI-powered real-time product recommendations in livestream marketing impact customer engagement and booking decisions in tourism? The findings reveal that this impact is not a direct causal relationship but a complex, mediated process. The subsequent discussion interprets these synthesized findings through a theoretical lens, elucidating the central psychological mechanisms, reconciling the imperative of human-AI synergy, and examining the critical, dual-faced role of trust and personalization.

The findings of this systematic review collectively demonstrate that the influence of AI-powered recommendations in livestream tourism is not a simple input-output phenomenon, but a complex psychological journey, which the S-O-R model compellingly explains. The confirmation of this model's robustness in this context is a critical theoretical contribution (Liu et al., 2024; Mei et al., 2025; Zheng et al., 2022). It moves the discourse beyond a technocentric view of AI efficacy to a psychographic one, illustrating that the real-time, interactive nature of AI recommendations serves as a powerful environmental stimulus (S) that must first be processed through the user's internal world (O). This synthesis reveals that AI's success is contingent on its ability to trigger not just cognitive assessments of relevance, but also affective states of telepresence and emotional arousal (Liu et al., 2024; Zheng et al., 2022), which are particularly vital for intangible, high-involvement tourism products (Cohen et al., 2014). This aligns with and extends the Uses and Gratifications theory, suggesting that effective AI recommendations fulfill deeper viewer needs for both personalized information and immersive entertainment, thereby fostering the engagement that precedes a booking decision (R). Ultimately, this review positions the S-O-R model as an indispensable framework for understanding how technological features translate into psychological value and, consequently, commercial outcomes in the dynamic context of livestream marketing.

One might assume that the most advanced AI would dominate the livestream, yet our synthesis challenges this narrative of algorithmic dominance by revealing a non-negotiable synergy with the human streamer (Kim, 2023; Liu et al., 2024; Mei et al., 2025). This raises a critical question: if AI cannot build trust *de novo*, how should its role be fundamentally designed? This finding can be interpreted through the lens of para-social interaction theory, which explains the one-sided, intimate feeling a viewer develops for a media persona. The reviewed evidence suggests that the human streamer is the primary vessel for this para-social relationship, generating the authenticity and trust that AI, as a purely logical entity, cannot manufacture de novo (Kim, 2023; Liu et al., 2024). The AI, in this context, functions not as a replacement but as a force multiplier for the streamer's effectiveness (Ding et al., 2025; Liu et al., 2024). While this dynamic appears to align with the "Computers Are Social Actors" (CASA) paradigm, our synthesis critically refines it. We must ask: Does CASA hold when a human is present? Our findings suggest that in a livestream setting, the social credibility of the *human* actor is not just a factor, but a prerequisite for the AI to be accepted as a competent "social" actor (Kim, 2023; Zhang & Wu, 2025). The identified model of "hierarchical collaboration", where the streamer curates and the AI calculates, provides a strategic blueprint for designing these systems (Ding et al., 2025; Liu et al., 2024; Wu & Yusof, 2024). It asserts that the most effective AI is one that operates transparently in service of enhancing the human connection, rather than seeking to supplant it, thereby ensuring that technological advancement does not erode the fundamental social drivers of livestream engagement and purchase decisions. The non-negotiable synergy between human streamers and AI, a central tenet of this review, was established within a specific cultural context. The para-social intensity and authority granted to streamers in East Asian markets may be a key reason for their foundational role. It is a critical open question whether this 'hierarchical collaboration' model holds with the same force in Western cultures, where audiences

might place different values on authenticity versus algorithmic efficiency, and where influencer authority may be less pronounced.

The identification of trust as the critical mediator and "psychological gatekeeper" elevates it from a peripheral concern to the central construct governing the entire customer journey in AI-infused livestreams (Mei et al., 2025; Zhu et al., 2023). This finding powerfully resonates with and extends Morgan and Hunt (1994) commitment-trust theory of relationship marketing, which posits trust as the key mediator between a partner's actions and the relationship's outcomes. In this context, the "partners" are the viewer, the streamer, and the AI system. The synthesis reveals a sophisticated "trust transfer" mechanism, whereby the high-credibility, para-social bond with the human streamer serves to bootstrap trust in the otherwise opaque AI algorithm (Kim, 2023; Zhang & Wu, 2025). This process is crucial for overcoming the "black box" problem often associated with complex AI, where users cannot scrutinize the logic behind a recommendation. The dual-object nature of trust, in the streamer's authenticity and the AI's competence, means that a failure in either dimension can sever the pathway to a booking decision (Liu et al., 2024; Wu & Yusof, 2024; Zhu et al., 2023). Consequently, this review contends that the primary function of the livestream's socio-technical environment is not merely to inform or entertain, but to actively construct and maintain this fragile ecosystem of trust. This reframes the key performance indicator for AI in this domain; it is not just algorithmic accuracy, but the system's demonstrable contribution to building a trustworthy experience that mitigates the high perceived risks of tourism purchases. The identified 'trust-transfer" mechanism, where the streamer's credibility bootstraps trust in the AI, must be critically examined through a cultural lens. In high-trust-ambiguity contexts (like a new technology), individuals in collectivist cultures may rely more heavily on in-group cues (the streamer) to reduce uncertainty. This mechanism may be less potent in individualistic cultures where personal assessment of the technology's utility and transparency is paramount. Thus, the universal applicability of trust as a mediator calibrated primarily through the human channel is a key hypothesis for future research, not a fact.

Finally, the paradox of personalization, its capacity to both engage and alienate, reveals that its implementation is less a technical challenge and more a strategic exercise in consumer psychology (Ding et al., 2025; Xie et al., 2022). This finding directly engages with the "personalization-privacy paradox," a well-established concept where users desire relevant content but resist the data collection required to enable it (Philp & Nepomuceno, 2024). Our synthesis deepens this understanding by identifying a second, equally critical tension: the clash between efficiency and exploration. While AI-driven personalization excels at optimizing for known preferences (exploitation), it inherently risks stifling the serendipitous discovery (exploration) that is a fundamental gratification of both livestreaming and travel planning. This creates a "filter bubble" that can undermine the perceived authenticity and excitement of the experience (Xie et al., 2022; Zhou et al., 2025). Therefore, the optimal "sweet spot" is not found by merely tuning an algorithm, but by designing for what can be termed "value-centric transparency" (Ding et al., 2025; Philp & Nepomuceno, 2024; Xie et al., 2022)" This means systems must be architected to not only be accurate but also to transparently communicate their benefit to the viewer, for instance, by explicitly curating a "surprising discovery" alongside hyper-personalized options, thereby justifying the use of their data. This moves the paradigm from covert data extraction to a value-driven partnership, transforming personalization from a potential source of skepticism into a cornerstone of a trustworthy and captivating digital hospitality experience.

Practical Implications

For tourism marketers and livestream platforms, this review offers several evidence-based recommendations:

1. Human-Centric AI Integration: Position AI as a decision-support tool for streamers, not a replacement. Train streamers to effectively contextualize and endorse AI recommendations to leverage trust transfer.
2. Transparency by Design: Implement explainable AI features that briefly justify recommendations (for example, "Based on your interest in beach destinations"). Balance hyper-personalized options with curated "surprising discoveries" to maintain exploratory appeal.
3. Trust-Calibration Mechanisms: Use streamer credibility to bootstrap trust in AI. Consider visual cues indicating streamer endorsement of AI suggestions.
4. Privacy-Preserving Personalization: Adopt granular privacy controls and value-justified data usage, clearly communicating how personalization benefits viewers.

5. Cross-Platform Adaptation: Recognize that the human-AI synergy model may require adjustment for Western audiences with different cultural expectations regarding influencer authority and privacy.

Implications for Future Research

This synthesis not only consolidates current knowledge but also charts a course for future inquiry. A sensitivity analysis confirmed that the exclusion of the sole weak-quality study did not alter the fundamental thematic structure or conclusions, reinforcing the robustness of the synthesized findings. Based on the remaining identified gaps and complexities, we propose the following research directions:

1. Cross-Cultural Validation: The overwhelming China-centric bias of the extant literature represents the most urgent gap. Future research must test the proposed theoretical model in Western (For example, using Amazon Live, TikTok Shop) and other cultural contexts. These studies should explicitly investigate how cultural dimensions, such as individualism-collectivism, uncertainty avoidance, and power distance, moderate the core relationships identified here, particularly the strength of the human-AI synergy and the trust-transfer mechanism. This will determine whether the 'hierarchical collaboration' model is universal or culturally specific.

2. From Intentions to Actual Behavior: Future research must bridge the intention-behavior gap by prioritizing longitudinal studies and field experiments that track actual booking conversions and spending, not just intentions. Partnerships with tourism platforms to analyze real user data are critical to validate the commercial impact of AI recommendations.

3. Algorithmic Transparency and Serendipity: Experimental studies are needed to design and test AI interfaces that operationalize value-centric transparency and quantify the optimal balance between personalized recommendations and serendipitous discovery. For instance, future research should test propositions such as: AI interfaces that explicitly justify recommendations with value statements (for example, "We suggest this based on your preference for family-friendly amenities") will generate higher trust and engagement than opaque recommendations, while also maintaining acceptance when introducing serendipitous options.

4. Ethical and Data Governance Frameworks: Qualitative and policy-oriented research is required to develop industry-specific ethical guidelines and data governance models that address privacy concerns without stifling the benefits of personalization.

CONCLUSION

This systematic review set out to synthesize how AI-powered real-time recommendations impact customer engagement and booking decisions within the livestream tourism marketing landscape. The synthesis of 15 empirical studies reveals that the influence is not a simple direct effect but a complex, psychologically mediated process. The findings robustly confirm the Stimulus-Organism-Response (S-O-R) model as a foundational framework, demonstrating that AI recommendations act as powerful external stimuli that must first navigate the user's internal cognitive and affective states, such as perceived trust, emotional arousal, and telepresence, before culminating in behavioral responses like heightened engagement and booking intentions.

A central tenet emerging from this review is the non-negotiable synergy between human streamers and AI (Kim, 2023; Liu et al., 2024). The evidence decisively refutes the narrative of algorithmic dominance, establishing instead a model of hierarchical collaboration where the human streamer serves as the trusted curator and emotional anchor, and the AI functions as a powerful, real-time decision-support tool. Within this dynamic, trust operates as the critical psychological gatekeeper, a dual-faceted mediator contingent upon both the streamer's authenticity and the AI's perceived competence. Furthermore, the review uncovers the dual-edged nature of personalization, where its power to engage is bounded by thresholds of perceived intrusiveness and the suppression of serendipity, necessitating a shift towards value-centric transparency in design.

The primary theoretical contribution of this review lies in its unified framework that explains the psychological mechanisms through which AI recommendations generate engagement and booking intentions in livestreams.

For practitioners, the findings provide a strategic blueprint: success hinges on designing AI systems that augment, rather than disrupt, the human streamer's credibility and the viewer's trust, while carefully balancing personalized relevance with exploratory discovery. While this review consolidates a fragmented field, the heavy geographical focus on a single market and the reliance on behavioral intentions in the extant literature underscore the critical need for the future research directions outlined. Ultimately, this review establishes that in the high-involvement context of tourism, the most effective AI is not the most autonomous, but the one that most seamlessly strengthens the human connection and builds a trustworthy, captivating digital experience.

Ethical Considerations

Ethical Approval

This study is a systematic review of previously published literature. As such, it did not involve the direct collection of new data from human or animal subjects, and therefore, ethical approval was not required.

Conflict of Interest

The authors declare no potential conflicts of interest with respect to the research, authorship, or publication of this article.

Data Availability

The data supporting the findings of this systematic review are derived from the 15 primary research articles included in the analysis, which are all cited in the reference list. The full dataset extracted and analyzed during this review is available in the summary tables (Tables 1 and 2) within this manuscript.

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