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Rethinking human–AI agency in tourism and hospitality: A framework for the agentic AI era

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ABSTRACT

This study critically examines the ontological assumptions underlying artificial intelligence (AI) research in tourism and hospitality, with growing attention to agentic AI. Existing literature predominantly conceptualizes AI as a tool, limiting discourse on how tourism experiences and sociotechnical systems are co-constructed through human–AI interactions. To address this gap, this study adopts a multi-method approach, combining bibliographic coupling, large language model (LLM)-assisted extraction of theories and variables, and expert interviews. Drawing on digital humanism, transhumanism, and posthumanism, it investigates how assumptions about human–AI relationships are embedded in existing studies. The findings reveal that tourism AI research remains grounded in instrumental human-centeredness framework, conceptualizing AI as an instrument for assisting or augmenting human capabilities. However, industry practice reveals AI as hybrid assemblages entangled with human labor, platforms, and data infrastructure. This study calls for a more relational, multi-layered understanding of human–AI interactions and contributes a framework comprising 15 theoretical propositions.

1. Introduction

Artificial intelligence (AI)-based technologies, including generative AI (GenAI), service robots, and autonomous systems, have become core infrastructures shaping tourism and hospitality (Gursoy & Cai, 2025). Their impact transcends operational efficiency and service quality (Brougham & Haar, 2017; Tan et al., 2025), transforming how human workers and tourists experience services, restructuring interaction patterns, and altering the conditions of tourism experiences (Shin, Jo, et al., 2026). Alongside this transformation, AI research in tourism and hospitality has expanded rapidly over the past five years, producing a substantial body of empirical studies and literature reviews (Dai Tuyen et al., 2025; Ghesh et al., 2024; Liao et al., 2025).

However, AI research in tourism and hospitality predominantly relies on epistemological frameworks that conceptualize AI as an object of human evaluation and a functional instrument for achieving human goals (Han et al., 2025; Sun, Wong, Xiong, & Li, 2026; Vorobeva et al., 2024). Existing studies on technology readiness (Alam et al., 2025; Duan et al., 2025), perceptions (Guan et al., 2025; Tan et al., 2024; Zhang & Jin, 2023), and perceived usefulness or ease of use (Sun, Wong, et al., 2026) have effectively delineated the psychological drivers of adoption. However, these approaches remain largely instrumentalist, positioning AI as a predictor or mediator of human attitudes and behaviors.

Underlying this trend are implicit ontological assumptions—the unexamined premises regarding the nature of AI that researchers adopt at the inception of their research design. The existing literature conceptualizes AI as an external, functional tool awaiting human acceptance. It treats technology as a nominal, omitted variable rather than a dynamic sociotechnical structure possessing generative mechanisms (Smith, 2006). This positioning fosters a theory-practice inconsistency and obscures AI's relational capacity to reconstruct tourism experiences constitutively.

Consequently, the limitation identified in this study is not a rejection of methodological anthropocentrism. Instead, it is a critique of instrumental anthropocentrism that reduces AI to a tool under human control. This critical inquiry aligns with contemporary discourse urging tourism research to move beyond adoption models and scrutinize how automation and algorithms reconfigure broader social and structural conditions (Tussyadiah, 2020). The human-centeredness that this study safeguards is normative, grounded in human dignity, ethical responsibility, and autonomy (Kumar & Choudhury, 2024). By acknowledging AI's

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relational agency and inherent opacity, researchers can better identify potential ethical risks while protecting human subjectivity and agency (Köbis et al., 2025).

Recent studies demonstrate that AI-driven marketing communications mitigate consumers' psychological barriers and proactively drive service interactions (Chai et al., 2026). Furthermore, algorithmic biases subtly influence individual attitudes and judgments in ways that users fail to consciously perceive (Williams-Ceci et al., 2026b). Within the tourism context, algorithm-based recommendations, rankings, and search architectures actively constitute the conditions under which tourists perceive and evaluate alternative choices (Cai, Cain, & Jeon, 2022; Kim, So, et al., 2025).

This reliance exposes three critical theoretical challenges. First, an ontological mismatch persists. Although AI increasingly functions as an active agent in co-producing decision-making and service quality, it is conceptualized as a passive tool evaluated by human users (Braidotti, 2025; Shin, Jo, et al., 2026). Second, the literature exhibits epistemological stagnation, as rapidly evolving AI phenomena continue to be explained using traditional frameworks that do not capture the complexity of human–AI entanglements (Braidotti, 2025; Liao et al., 2025). Third, this theoretical inertia intensifies the gap between academic discourse and practice, limiting scholars' ability to account for the context-specific ways in which AI operates in real-world settings (Bennett, 2025). While recent systematic literature reviews have mapped intellectual structures (Dai Tuyen et al., 2025; Ghesh et al., 2024; Liao et al., 2025; Prasanna et al., 2025), they have rarely interrogated these underlying assumptions, often remaining at the level of descriptive enumeration or narrowly fragmented themes (Ghorbanzadeh et al., 2025).

Recent scholarship has addressed this gap through philosophical and humanistic lenses, recognizing that AI is a technological development that challenges foundational assumptions about what it means to be human. When algorithms intervene in activities regarded as uniquely human, such as judgment, interpretation, creativity, and decision-making, Enlightenment ideals of authorship, autonomy, and accountability are called into question (Nida-Rümelin & Winter, 2023). Consequently, analyzing AI solely in terms of efficiency is insufficient. Understanding its implications requires engagement with the philosophical foundations of human dignity, subjectivity, and responsibility embedded in technological design and deployment (Nath & Manna, 2023).

To transcend the binary opposition that views AI either as a tool for efficiency or as an autonomous entity independent of humans, this study proposes an ontological reframing. Rather than discarding human-centered perspectives, it emphasizes that the human–technology relationship is a relational process continuously reconfigured within specific situations and contexts. To systematically organize this ontological reframing, this study develops an overarching theoretical framework based on three distinct yet complementary theoretical lenses—digital humanism, transhumanism, and posthumanism. Digital humanism emphasizes the safeguarding of human dignity and democratic values in technological development (Hahne & Schmoelz, 2025). Transhumanism highlights the enhancement and possible reconfiguration of human capacities through technological integration (Brusseau, 2023). Posthumanism emphasizes the reconceptualization of agency and meaning across human and non-human assemblages, challenging anthropocentric assumptions (Cadman et al., 2025).

From a posthumanist perspective, agency is not an inherent property of individuals; instead, it is a distributed phenomenon forged through the entanglement of humans, technologies, and data (Vial & Grange, 2024). This does not imply that AI possesses human-like intentionality. Rather, it underscores how non-human elements, such as algorithmic recommendations and platform structures, actively shape the conditions of human choice. For instance, a tourist may perceive their choice of destination as an act of free will; however, it is co-constituted by search algorithms and the curated visibility of reviews. Thus, the tourism experience is a relational outcome co-produced by humans and digital infrastructures.

This paper operates at a meta-discursive level of analysis, critically reflecting on the theoretical paradigms and ontological assumptions within tourism AI scholarship. It addresses four research questions (RQs).

RQ1: What knowledge structures have emerged in tourism AI research, and what implicit ontological assumptions do they adopt?
RQ2: How do these assumptions influence theoretical choices and variable configurations?
RQ3: What discrepancies exist between academic discourse and the operational realities of AI deployment?
RQ4: How can the lenses of digital humanism, transhumanism, and posthumanism enrich future AI research?

To address these questions, this study analyzes AI research in hospitality and tourism published since 2021. It examines how ontological assumptions are embedded in theoretical choices, variable configurations, and interpretive frameworks. It employs bibliographic coupling to map the knowledge structure, large language model (LLM)-based information extraction to identify patterns of theory–variable coupling, and interviews with industry experts to compare academic discourse with operational realities. By integrating three complementary perspectives—digital humanism, transhumanism, and posthumanism—by examining how each informs theoretical positioning, variable selection, and interpretive logic. It offers a roadmap for advancing tourism AI research toward a more ontologically grounded, pluralistic, and relational understanding. Rather than replacing existing approaches, it expands the field's conceptual boundaries by situating tourism AI studies within a broader ontological spectrum. The findings have important implications for practitioners and policymakers, suggesting that evaluating AI adoption requires moving beyond technical metrics to consider broader societal impacts, such as accountability, inclusivity, and labor transitions.

2. Literature review

2.1. AI philosophy and ontological debates

The contemporary societal transformation mediated by AI has brought ontological questions regarding technology to the forefront. As AI begins to execute or replace functions traditionally regarded as uniquely human, such as cognition, judgment, and communication, the explanatory power of traditional instrumentalism, which conceptualizes technology as a value-neutral tool for achieving human objectives, is revealing its limitations (Verbeek, 2005). Consequently, contemporary philosophies of technology and AI reframe technology as an ontological and mediational condition that actively structures human cognitive architectures and social practices. To comprehend this paradigmatic shift, it is essential to examine how the conceptualization of AI has transitioned from a rule-based symbolic framework to a relational and embodied mode of existence.

Historically rooted in Cartesian rationalism, the early AI paradigm equated intelligence with formal rule-based symbol manipulation, giving rise to computationalism (Newell & Simon, 2007). However, Turing (1950) shifted the locus of intelligence from internal consciousness or essence to externally observable performance through the Turing Test. This was a thought experiment proposing that a machine could be deemed intelligent if a human evaluator could not distinguish it from a human through linguistic interaction alone. This behaviorist turn faced a formidable challenge from Searle's (1980) "Chinese Room" argument. Searle posited that if an individual locked in a room with no knowledge of Chinese produced flawless responses to Chinese queries using only a rule manual (akin to a computer program), this would constitute a symbol manipulation rather than genuine understanding. In short, the

formal arrangement of syntax does not guarantee the acquisition of intrinsic semantics, implying that mere symbolic computation cannot achieve authentic intelligence or intentionality. This philosophical tension is highly relevant in contemporary empirical domains. For instance, consumer behavior research demonstrated that delivering negative updates via AI rather than humans reduced adverse consumer reactions because users perceived AI as lacking intentionality (Garvey et al., 2023), a phenomenon anchored in the instrumentalist premise that viewed technology as an intentionless instrument.

To transcend the limitations of this computational–symbolic debate, phenomenological and hermeneutic perspectives reframe understanding as a historically conditioned, relational process. Within Gadamerian hermeneutics, meaning is continuously co-shaped through the hermeneutic circle—an iterative interaction between the interpreter and the phenomenon. Extending this into sociotechnical environments, Kudina (2021) conceptualized the hermeneutic lemniscate—an infinite, dynamic loop in which humans interpret technological objects while technology recursively molds human interpretive frameworks.

Similarly, Ihde's (1995) postphenomenology explicitly delineated technological mediation by classifying human–technology–world relationships into four distinct configurations. These include the following.

- Embodiment relationships: Technology becomes part of human perception (e.g., AI-enabled smart glasses or augmented reality [AR] tour guides mediating tourists' experiences).
- Hermeneutic relationships: Individuals interpret technological outputs (e.g., interpreting and using travel itineraries or destination information generated by GenAI).
- Alterity relationships: Technology is experienced as a quasi-other (e.g., interacting with hotel service robots or GenAI travel assistants during service encounters).
- Background relationships: Technology operates outside conscious awareness while shaping human experience (e.g., AI-driven personalized recommendations, demand forecasting, and dynamic pricing that subtly influence tourists' experiences).

Verbeek (2005) extended this postphenomenological lineage through the lens of co-constitution, arguing that humans and technologies do not exist as independent entities but are mutually constituted through their relational interplay. This provides an important point of convergence with embodied cognition, which does not reduce human cognition to isolated internal representations. Embodied cognition argues that cognition operates through modal representations grounded in sensorimotor experience (Siemens et al., 2022). In this view, human thought and knowledge formation are not confined to information processing within the brain; instead, they are dynamically constituted through bodily motility, sensory experiences, and continuous interaction with the environment (Rolla, 2026).

More specifically, concepts and meanings are grounded in the ongoing interaction among perception, action, the body, and the environment, rather than being represented solely as abstract information stored within the brain. Thus, knowing a concept involves not merely possessing an abstract definition but also the capacity to reactivate the perceptual, motor, bodily, and contextual experiences associated with that concept. This framework provides the theoretical foundation for agent-based and embodied AI systems that actively perceive their environments and autonomously adjust their actions.

Consequently, contemporary philosophical inquiry converges on the "uniqueness thesis," that is, the critical interrogation of whether AI is merely an extension of conventional tools or a novel technological agent possessing distinct ontological and epistemological properties that differentiate it from historical innovations (Prichea, 2026). While ethical traditionalists enforce strict human control by treating AI as a value-neutral instrument, proponents of the uniqueness thesis recognize that AI's autonomous learning capabilities and opaque decision-making mechanisms fracture the long-standing modernist belief in human exceptionalism (Himma, 2003).

Acknowledging AI's agency is not an attempt to abdicate human accountability to technology. Instead, it serves as a prerequisite for preventing teleological inversion—a phenomenon in which algorithmic optimization logic recursively dictates and dominates human purposes and choices (Prichea, 2026). Thus, the crux of the AI ontological debate lies in establishing a new normative human-centeredness. It should reconfigure the human–AI relationship while safeguarding human dignity and autonomy and recognizing technology's relational agency. Depending on how AI is conceptualized, the interpretation of the empirical findings and the paradigmatic direction of future scholarship will diverge. The following section utilizes these divergent ontological assumptions to critically evaluate how they have historically restricted the theoretical boundaries of AI research in tourism and hospitality.

2.2. AI research and ontological assumptions in tourism and hospitality

Although no single definition of AI exists, this study adopts a functional perspective (Sheikh et al., 2023). Recent research has adopted functional and task-oriented definitions as pragmatic alternatives. AI is understood as a system that perceives its environment and acts with a certain degree of autonomy to achieve specific goals (Sheikh et al., 2023). This formulation identifies minimal criteria—perception, goals, action, and autonomy—while accommodating diverse applications. Under this definition, chatbots, service robots, and recommendation systems in tourism and hospitality are categorized as AI applications, regardless of their physical or digital form (Knani et al., 2022). Within this conceptual scope, AI has evolved from rule-based automation to machine learning, deep learning, and GenAI. It functions as a sociotechnical infrastructure for prediction, recommendation, decision-making, and content generation (Tussyadiah, 2020). However, LLMs and adaptive algorithms increasingly structure all stages of the tourism journey, from exploration and planning to on-site engagement and post-visit evaluation, complicating a simple user–tool dichotomy (Shin, Jo, et al., 2026).

Nonetheless, tourism AI research remains strongly path-dependent on decades-old psychological models, such as the technology acceptance model (Fuentes-Moraleda et al., 2020; Go et al., 2020), the unified theory of acceptance and use of technology (Ghorbanzadeh et al., 2025; Zhang & Hwang, 2024), and the theory of planned behavior (Chauhan & Jishtu, 2026; Hwang et al., 2024; Sujood et al., 2022). These studies explain AI adoption or use intentions through perceived usefulness, enjoyment, trust, and related cognitive mechanisms (Said et al., 2024; Solakis, Katsoni, Mahmoud, & Grigoriou, 2024), positioning AI as an external stimulus evaluated by rational human actors.

This variable-centric approach, while instructive for explaining how AI modulates human decision-making, restricts the analytical capacity to investigate how AI reconfigures the service landscape, organizational structures, and the foundational conditions of choice. Hence, it reflects an academic manifestation of ethical traditionalism and technological instrumentalism. Although some studies address interactivity, relationality, and anthropomorphism (Orden-Mejía & Huertas, 2022; Yu et al., 2024), meaning-making authority remains largely human-centered. Even ecosystem and value co-creation perspectives (Buhalis & Sinarta, 2019; Solakis et al., 2024) conceptualize AI as a facilitator of human goals. Thus, the issue is the structural misalignment between the relational expansion of technology and the human-centered epistemological frameworks used to interpret it. While AI actively reconfigures the constitutive conditions of the tourism experience (Shin, Xie, et al., 2026 Measuring generative AI-mediated travel experiences: Development and validation of a multidimensional scale), including informational visibility, choice architectures, and expectation formation, extant scholarship fails to adequately theorize this conditioning role, revealing conspicuous limitations in explaining three critical practical and theoretical challenges.

First, it fails to capture the phenomenon of teleological inversion within service systems. Traditional configurations presuppose that humans autonomously establish goals and that technology serves as a means. However, advanced AI environments induce an inversion in which algorithmic optimization logics recursively dictate and dominate human purposes and choices (Prichea, 2026). For instance, when a tourist agrees with and expresses satisfaction with an AI-recommended itinerary, the traditional technology acceptance model interprets this as successful technology acceptance. However, it fails to unveil the structural dynamics whereby the tourist's sovereign agency is preconditioned and steered by invisible choice architectures.

Second, it induces epistemological stagnation, leaving the inversion of agency and the subsequent erosion of identity at service touchpoints unexplained. When AI systems evaluate employee performance and service robots radically reconfigure workflow processes, employees experience psychological alienation and role displacement. Such profound existential transformations cannot be accounted for by legacy cognitive models that treat AI as a task-assisting tool. Third, it creates a qualitative discourse gap regarding the transformation of hospitality values. While the implementation of automation and adaptive algorithms maximizes technical utility and operational efficiency, the genuine hospitality experienced by tourists undergoes a fundamental qualitative transformation. This profound shift cannot be captured within the rigid boundaries of existing variables, accelerating the disconnect between academic discourse and industry realities.

The aim is to reconsider and broaden the ontological assumptions underpinning human–technology relationships. Rather than presupposing humans and AI as separate subjects and objects, the tourism experience can be understood as co-constituted within a sociotechnical assemblage of humans, algorithms, data, and infrastructure (Vial & Grange, 2024). An assemblage refers to a sociotechnical network system in which heterogeneous human and non-human elements provisionally coalesce for a specific purpose to generate organic dynamism (Müller, 2015). This perspective complements, rather than replaces, human-centered approaches by capturing relational dimensions that remain underexplored. Furthermore, as an alternative roadmap for overcoming the limitations of instrumentalism and providing a robust defense of human dignity, this study systematically proposes a pluralistic ontological spectrum encompassing digital humanism, transhumanism, and posthumanism.

2.3. An ontological spectrum in AI research within tourism and hospitality

As discussed, the ontological status of AI spans a diverse spectrum, ranging from technology as a tool for human ends to an augmenting medium that extends human capacities to a relational entity whose agency is constituted through interactions between human and non-human elements. In tourism and hospitality, AI research addresses technological innovation. However, its interpretive frameworks implicitly rely on specific conceptions of the human. This section situates these conceptions along a normative spectrum, extending from digital humanism, which maintains AI under human control, through transhumanism, which pursues human enhancement, to posthumanism, which challenges the boundaries between the human and the non-human. This spectrum provides an analytical framework for understanding how assumptions about human nature and being shift alongside the evolution of AI.

2.3.1. Digital humanism: The persistence of normative human-centeredness

Humanism, rooted in the Renaissance and Enlightenment, emphasized humans as rational and autonomous beings (Nida-Rümelin & Winter, 2023; Prem, 2024). This aligned with the traditional doctrine of human exceptionalism, which posited that humans uniquely possessed subjective intentionality and qualitative experience (Merzlyakov, 2022). However, it was criticized for its Eurocentrism and limited account of structural inequalities (Halimi, 2014), leading to newer forms of humanism emphasizing inclusivity and responsibility. This evolved into the digital context as “digital humanism,” which integrates human dignity and autonomy into technological design (Serrano et al., 2024). It can be understood as a contemporary extension of Aristotle's concept of practical wisdom (*phronesis*) (Volpi, 2013). Digital humanism maintains that, while technology provides instrumental value, its ultimate purpose remains human-centered (Hahne & Schmoelz, 2026). It combines a realistic understanding of AI and digitalization with heightened human responsibility, reinforcing human authorship rather than delegating accountability to digital systems (Nida-Rümelin & Winter, 2023). Hahne and Schmoelz (2026) argued that framing AI as an object of trust or a moral agent projects human norms onto technology. Instead, human-centered design principles, such as transparency, explainability, accountability, and controllability, should guide AI governance.

Digital humanism acknowledges the epistemic opacity of AI architectures to defend human-centered sovereignty. That is, scholarship can logically justify its demand for more rigorous, human-centered design and control mechanisms to counter the ethical risks of systemic complexity only by explicitly recognizing the structural opacity of algorithmic decision-making processes. In hospitality, this premise carries an urgent practical imperative. AI-driven performance-evaluation algorithms in front-office or housekeeping systems often eradicate the context-specificity of work, trapping emotional laborers within pervasive, real-time surveillance networks (Köbis et al., 2025). Hence, digital humanism encourages researchers to look beyond adoption metrics and poses the normative question: Is the dignity and sovereignty of human employees fundamentally preserved within these AI-mediated environments?

However, tourism studies are characterized as an applied social science that prioritizes pragmatic values, such as the maximization of management efficiency, service optimization, and consumer satisfaction (Tribe, 2006). Since the industry primarily views technology implementation through the lens of immediate financial returns and operational cost reductions, academic research has been biased toward validating the perceived usefulness and adoption intentions of technology (Law et al., 2020) rather than highlighting invisible normative hazards, such as algorithmic alienation or the erosion of employee autonomy (Tribe & Mkono, 2017).

Although a segment of the literature addresses ethical concerns, such as algorithmic bias, data privacy, and human agency (Wang, Guo, et al., 2025), these efforts frequently remain confined to technical mitigation or regulatory compliance. They stop short of a radical ontological interrogation of how technology reconfigures the tourism experience and human roles. Thus, AI applications in tourism and hospitality, including AI concierge systems, service robots, dynamic pricing algorithms, and employee performance evaluation systems, should remain transparent, explainable, and subject to meaningful human oversight. Rather than evaluating these technologies solely in terms of adoption, efficiency, or service quality, future research should examine whether AI-mediated service environments preserve employee autonomy, tourist dignity, informed consent, and human accountability. Therefore, the current research landscape faces a dual challenge—it must satisfy the practical imperatives of digital humanism and confront the broader ontological implications of AI.

2.3.2. Transhumanism: The expansion of instrumental boundaries

From a transhumanist perspective, the central issue is the ontological premise that human existence can be reconstituted through technology. Transhumanism is defined as the technological transcendence of human biological and cognitive limits (Mayer & Mayer, 2025). Since its initial conceptualization by Julian Huxley (Mayer & Mayer, 2025), transhumanism has evolved into a philosophical and scientific movement calling for a fundamental redefinition of human existence and the human–technology relationship (Frascaria et al., 2026). Within this framework, technology is not merely an external tool but also a mediator

that extends human cognitive, perceptual, and judgment capacities. This shift can be understood as a practical translation of the "extended mind thesis" and "embodied cognition" from cognitive science and the philosophy of technology (Schultz, 2025). Thus, the human–technology relationship is reconfigured from simple use to co-evolution (Brusseau, 2023).

Enhancement does not merely increase efficiency. When human decision-making is intertwined with algorithmic recommendations, predictive models, or generative systems, judgments cannot be reduced to autonomous human processes. This transition raises issues of redistributed autonomy and responsibility (Hughes, 2010), as well as concerns that technological enhancement could produce new social inequalities and power structures (Bostrom, 2003; Frascaria et al., 2026). Thus, enhancement simultaneously enables mechanisms of liberation and exclusion.

Even when these technologies are not fully realized, the idea that human identity and experience can be reconstituted through technology remains present in theoretical and social imagination. In tourism and hospitality, this transformation is partially observable. AI systems (e.g., planning, recommendation, and translation) reshape how travelers perceive information and make decisions, reconfiguring the cognitive basis of the tourism experience (Shin, Jo, et al., 2026). Smart infrastructures and adaptive algorithms function as extensions of the tourist's mind. Therefore, tourists should be understood as augmented subjects co-constituted with technology.

This perspective prompts a reconsideration of traditional approaches that explain the tourism experience solely as an internal psychological process. In tourism practice, AI-powered itinerary generators, wearable travel assistants, AR navigation, real-time translation, and personalized recommendation systems increasingly function as cognitive extensions. These technologies reshape how tourists perceive destinations, process information, and make decisions, illustrating that AI augments human cognition and improves operational efficiency.

2.3.3. *Posthumanism: The relational turn and agential entanglement*

Posthumanism critiques anthropocentric ontology by interrogating the traditional assumption that agency and meaning-making are exclusively ascribed to human actors. Extending the core inquiry of postphenomenology, embodied cognition, and relational ontology, this framework underscores that humans, technology, and the environment do not pre-exist as discrete entities. Instead, they are fundamentally co-constituted through ongoing relational processes. It emphasizes understanding humans as beings entangled with nature, technology, and material environments, rather than as autonomous, independent agents (Nath & Manna, 2023). Hence, from a posthumanist perspective, agency is not predicated on intrinsic attributes, such as consciousness or intentionality. Rather, it emerges relationally through the intra-actions of human and non-human elements within sociotechnical assemblages (Barad, 2007; Barefield & Freeman, 2026).

Therefore, AI agency is predicated on its operational modality as a distributed, systemic construct (Penner et al., 2026). In recent AI scholarship, this relational paradigm has been expanded through burgeoning discourses on agent-based AI and embodied AI (Mesquita et al., 2026). This aligns with the posthumanist perspective because it refrains from conflating AI agency with anthropomorphic consciousness or intentionality. Instead, it conceptualizes such agency as a relational capacity that actively shapes action possibilities within a given environment. Nath and Manna (2023) framed humans as products of nature that coexist with other entities, highlighting the limitations of anthropocentric ethics and ontology. This extends into sociotechnical contexts. Forlano (2017) contended that humans and non-humans share agency within sociotechnical networks, repositioning technology as an operative agent rather than a tool.

Braidotti's (2019) articulation of critical posthumanism deconstructed the notion of autonomous, self-contained individuals and emphasized relational and ecological subjectivity. Subjects are constituted through relationships with others and the environment. This relational turn was further radicalized in Barad's (2007) agential realism, which treats being as constituted through agential entanglement, where existence and meaning emerge relationally. Hence, agency is understood as a relational and performative accomplishment emerging through the ongoing intra-actions of human and non-human elements. Similarly, Latour's (1996) actor-network theory explained agency and action as the emergent effects of networks of human and non-human actors rather than the intentional products of human agents. Thus, tourism is a process co-constructed by tourists, platform architectures, databases, and algorithmic models within an assemblage, instead of being an outcome of individual tourist choices.

The advent of GenAI extends this relational ontology. Rather than functioning as passive tools, LLMs and image-generation systems operate as sociotechnical infrastructures that produce text and images via probabilistic computation over large datasets. Hayles (2017) described nonconscious cognition as an autonomous cognitive process of technological agents that gather, process, and structure information and generate alternatives through sophisticated, system-inherent computational mechanisms, even in the absence of human-specific subjective consciousness or intentionality. Hence, she underscored that meaning-making is not inherently tethered to human dependency. Hui (2020) analyzed digital objects and algorithmic modes of being and showed that technological architectures reshape the conditions for perception and experience. Ou et al. (2024) emphasized distributed cognition, noting that individual thinking and meaning-making emerge through the entanglement of humans, technology, and material environments and are expanded through interaction with external cognitive resources, such as AI.

Nevertheless, relational ontology does not imply the disappearance of the human. As Braidotti (2019) argued, posthumanism is not about leaving the human behind; instead, it is about rethinking the human beyond dualistic assumptions. Torres-Martínez (2025) argued that posthumanist critique risks excessively relativizing uniquely human capacities for meaning-making. Hence, even within relational entanglements, humans should be understood as conscious, open organisms whose reflective and normative capabilities remain central.

Tourism experiences can no longer be reduced to tourist intent and choice. They emerge within sociotechnical assemblages shaped by algorithmic curation, database architectures, and interface design. Ranking algorithms on booking platforms (e.g., Booking.com), generative itinerary design, and AI-based emotion-responsive systems operate as relational elements that reshape hospitality practices and the tourist–host relationship. Hence, human decisions are co-constituted through ongoing interactions with algorithmic architectures. Furthermore, destination management organizations increasingly rely on predictive AI for visitor dispersion and resource allocation, shifting decision-making from individual managerial intuition to algorithmically optimized coordination (Prichea, 2026). Therefore, tourism is constituted within an assemblage of tourists, platform architectures, data flows, algorithms, and physical space, while hospitality is co-produced by human service providers and technological mediation (Shin, Jo, et al., 2026).

Consequently, tourism and hospitality constitute a networked performance involving human and non-human actors. For example, a tourist may perceive a destination choice as an individual decision. However, that decision is simultaneously shaped by recommender systems, search rankings, platform visibility, user-generated content, and algorithmic personalization. Similarly, destination management increasingly relies on AI-driven visitor-flow prediction, demand forecasting, and resource allocation. This demonstrates that tourism experiences and governance emerge through interactions among humans, algorithms, platforms, and data infrastructures.

Collectively, these three ontological perspectives provide an analytical framework for understanding AI in tourism and hospitality (Table 1). They offer distinct interpretations of the epistemological

Table 1
AI conceptualization along the human-centeredness spectrum.

Orientation	Epistemological position	Tourist experiences	Destination management & service interaction	Normative implications
Digital humanism	Instrumental human-centeredness (human control)	User-controlled customization: AI supports human decisions; human choices primarily shape experiences.	Human-governed interactions: AI operates under human oversight to support service efficiency.	Human-centered compliance: Human accountability, data privacy, and algorithmic transparency.
Transhumanism	Augmented human-centeredness (human enhancement)	Augmented choice: Tourists rely on algorithmic predictions to enhance decision-making.	Co-evolutionary service systems: Human capabilities are augmented by AI in hybrid workplaces.	Expanded accountability: Legal and ethical frameworks for AI-enhanced decisions.
Posthumanism	Relational posthumanism (distributed agency)	Relationally co-constituted experiences: Experiences emerge through tourists, algorithms, and data infrastructures.	Networked performance: Hospitality is co-produced through human–AI sociotechnical networks.	More-than-human governance: Systemic resilience through assemblage-level oversight of algorithmic impacts.

position underpinning AI, the configuration of tourist experiences, destination management, service interactions, and their normative implications. Furthermore, they reflect different assumptions about the human–technology relationship, including the position of humans, the role of AI, the configuration of tourism experiences, and the distribution of ethical responsibility.

2.4. A critical examination of extant review studies on AI

With the rapid quantitative expansion of AI research in the tourism and hospitality industry, a growing body of bibliometric and review studies systematically synthesizes this literature (Table 2). AI research in this field encompasses a range of topics, including employee acceptance, consumer adoption, GenAI, chatbots, and big data analytics. Hence, numerous review studies have mapped research domains, methodological trends, and future research agendas in a structured manner (Dai Tuyen et al., 2025; Dwivedi et al., 2024; Kumawat et al., 2025; Li, Xi, et al., 2025; Prasanna et al., 2025; Rasheed et al., 2024; Zhang et al., 2026).

While these reviews provide valuable syntheses of the rapidly expanding literature, they devote relatively little attention to the epistemological assumptions underlying the empirical studies. If individual empirical studies exhibit path dependency on human-centered epistemologies, reviews that synthesize this literature inadvertently reinforce these assumptions. Existing reviews primarily contribute to the literature by categorizing studies quantitatively and organizing them into thematic domains. However, they give comparatively less attention to the implicit conceptions of human agency and technology embedded in this body of research. Hence, knowledge production continues to treat AI as an exogenous stimulus, reproducing existing epistemic structures and amplifying the structural misalignment between evolving technological ontologies and the epistemological frameworks used to interpret them.

This becomes evident when examining the representative empirical studies synthesized within these reviews. A substantial proportion of tourism and hospitality AI research continues to explain AI-related outcomes through human-centered cognitive and behavioral mechanisms. Studies examining AI adoption, service robots, and conversational AI frequently employ constructs such as perceived usefulness, perceived ease of use, technology readiness, trust, perceived value, satisfaction, attitude, and behavioral intention to explain tourists' and employees' responses to AI-enabled services (Gong & Yu, 2025; Jerez-Jerez, 2025). Similarly, employee-focused AI research predominantly examines how AI influences employee acceptance, AI trust, work attitudes, and performance outcomes (Hur et al., 2026). It positions AI as an external technological stimulus affecting human cognition and behavior rather than as an active component shaping organizational processes (Gong, 2025; Patwary et al., 2024). Although these studies generate important insights into human responses to technological change, the repeated application of such variables reveals a dominant epistemological orientation in which AI is primarily conceptualized as an object of evaluation and adoption (Topsakal & Çuhadar, 2025). Therefore, the issue is that the cumulative synthesis of these studies reproduces a restricted understanding of AI's role within tourism systems. When review studies aggregate predominantly human-centered models without interrogating their underlying ontological assumptions, they unintentionally consolidate an instrumental view of AI as a controllable technological resource designed to influence human outcomes.

This structural limitation manifests in four interrelated dimensions. The first is "functional instrumentalization." AI is predominantly conceptualized as a managerial tool that enhances efficiency, productivity, sustainability, or innovation (Li et al., 2021, 2025b; Majid et al., 2023). Existing reviews of AI applications in tourism and hospitality frequently categorize AI according to operational outcomes, including service efficiency, productivity improvement, sustainability enhancement, and innovation performance. They emphasize what AI enables organizations to achieve rather than how AI transforms the relational conditions of tourism experiences (Tussyadiah, 2020). While analytically useful, this perspective is complemented by theoretical discourses on AI as an experience-mediating relational actor. This theoretical expansion is essential to fully capturing how humans and technology dynamically co-constitute synchronized experiences in real time within advanced service encounters.

The second is "methodological structuralism." Scientometric mapping and keyword clustering effectively reveal intellectual networks and thematic evolution (Cai et al., 2024; Kong et al., 2023). However, since these approaches primarily identify publication patterns, keyword co-occurrence, and thematic structures, they rarely examine whether the accumulated knowledge is shaped by recurring assumptions about human agency and technological roles (Hall, 2011). These macro-level visualizations illuminate what has been studied rather than the conceptions of humanity that are repeatedly reproduced across studies.

The third is the "human-centered logic of experience." Integrative reviews grounded in technology acceptance and behavioral theories explain the effects of AI through human cognitive and affective mechanisms (Ahmad & Rasheed, 2026; Zhang et al., 2026). For instance, reviews of consumer-oriented AI research emphasize adoption intention, satisfaction, perceived value, trust, and service evaluation as primary outcomes. They reflect a dominant analytical logic in which AI functions as a stimulus whose consequences are assessed through human responses (Law, Lin, Ye, & Fong, 2024). This approach remains indispensable, as it preserves human normative agency and evaluative authority. Building upon this foundation, the present study broadens the paradigm by incorporating the dynamic interplay through which AI-mediated environments structurally configure human cognitive cues.

The fourth is "ontological non-reflexivity." As AI increasingly structures visibility, choice architectures, and decision environments in tourism, several reviews continue to interpret it primarily in terms of adoption, management, or performance outcomes (Dwivedi et al., 2024; Liao et al., 2025). For example, studies on recommendation systems, GenAI, and algorithmic service platforms focus on user acceptance or performance consequences. However, they pay less attention to how these systems participate in shaping the conditions under which tourism

Table 2
Key reviews on AI in tourism and hospitality.

Authors	Approach	Focus	Key findings
Li et al. (2021)	Systematic review	AI-enabled services in tourism and hospitality	Develops a typology of AI-based services and an integrative framework.
Doborjeh et al. (2022)	Systematic review	AI techniques, algorithms, and application domains	Provides a comprehensive classification of AI methods and application areas.
Knani et al. (2022)	Bibliometric	Intellectual structure, thematic evolution, and research trends (1984–2021)	Maps key journals, authorship networks, keyword clusters, and thematic trajectories.
Kong et al. (2023)	Bibliometric	Long-term evolution and thematic shifts (1991–2021)	Identifies four dominant research clusters and traces temporal changes in research focus.
Majid et al. (2023)	Systematic review	The role of intelligent automation in sustainability transitions	Identifies sustainability-oriented AI applications and proposes the AI4GoodTourism framework.
Dwivedi et al. (2024)	Review of reviews	Fragmentation of AI research in tourism and hospitality	Offers a comprehensive synthesis of AI research streams and future research directions.
Rasheed et al. (2024)	Systematic review	Consumer adoption of or resistance to AI and robotics in hospitality	Synthesizes drivers and barriers and proposes a unified framework grounded in behavioral reasoning theory.
Cai et al. (2024)	Scientometric review	Intellectual structure and evolution of big data analytics research in hospitality and tourism	Visualizes key themes, intellectual foundations, COVID-19-related shifts, and future research directions.
Ghesh et al. (2024)	Conceptual review	Fragmented understanding of AI-driven customer experience	Reframes AI as an integral component of the service experience rather than a back-end technology.
Tuo et al. (2025)	Bibliometric	Lack of integrative perspectives on AI research in tourism	Proposes a comprehensive framework synthesizing the large-scale AI–tourism literature.
Dai Tuyen et al. (2025)	Systematic review	Rapid diffusion of ChatGPT in tourism and hospitality research, education, and practice	Systematically reviews ChatGPT applications, opportunities, and challenges.
Prasanna et al. (2025)	Systematic review	Conversational AI chatbots in tourism	Organizes antecedents, decision processes, and outcomes of chatbot adoption.
Liao et al. (2025)	Bibliometric	Long-term knowledge structure of AI research in tourism and hospitality	Identifies research productivity, core themes, research frontiers, and theoretical bases.
Kumawat et al. (2025)	Systematic review	Employee-focused AI adoption research in hospitality	Synthesizes employee perceptions, attitudes, and performance outcomes related to AI adoption.
Li, Xi, et al. (2025)	Integrative review	GenAI research in tourism	Systematically categorizes antecedents, applications, and impacts of GenAI.
Lasarov et al. (2026)	Systematic review	Research–practice gap and GenAI-enabled knowledge translation in tourism	Proposes a GenAI-driven process for curating and translating academic knowledge.
Zhang et al. (2026)	Systematic review	Consumer-centered impacts of GenAI in hospitality and tourism	Integrates the positive and negative effects of GenAI on consumer perceptions, experiences, and behaviors.

experiences and organizational decisions emerge. Thus, AI is treated as an object of analysis rather than as a constitutive element shaping tourism experiences. These limitations highlight the need for a meta-theoretical reflection that moves beyond thematic synthesis to interrogate the normative and ontological assumptions that structure tourism AI research.

To address these limitations, this study systematically identifies theory–variable coupling patterns through a combination of bibliometric coupling analysis and LLM-based information extraction. This enables a systematic tracing of the implicit ontological assumptions embedded throughout the literature. Additionally, expert interviews provide an empirical point of comparison for examining the ontological mismatch between academic discourse and operational realities. Rather than dismissing prior scholarship, this study renders explicit the normative and ontological coordinates that underpin it. It repositions tourism and hospitality AI research along a broader humanistic spectrum. Furthermore, it elucidates the limitations of a purely instrumental view of technology and constructs a theoretical foundation for normative human-centeredness that robustly safeguards human dignity and autonomy. It opens a conceptual space to rethink human–technology relationships beyond the traditional subject–object dichotomy.

3. Methodology

To make explicit the normative and ontological assumptions underpinning AI research in tourism and hospitality, this study adopted a multi-analytical methodological approach. Since such assumptions are often implicitly embedded within theoretical choices, research designs, and variable constructions, they cannot be captured using a single analytical method. Instead, it is necessary to examine the structural configuration of the research field and the micro-level theoretical logics through which human–technology relationships are conceptualized.

This study integrated quantitative bibliometric analysis, LLM-based systematic construct extraction, and qualitative interviews to simultaneously examine the macro-level knowledge structure and the micro-level causal logics shaping AI research in tourism and hospitality. The research process comprised three stages.

(1) Bibliographic coupling analysis
(2) LLM-driven extraction of theories and variables, followed by theory–variable mapping visualized through Sankey diagrams
(3) Interpretive validation through comparative analysis with industry practitioners

3.1. Phase 1: Quantitative mapping of the AI research landscape

3.1.1. Data collection

To analyze the knowledge structure of AI in the tourism and hospitality industry, this study collected literature from the Web of Science (WoS) and Scopus databases as of December 2025. Following the search

strategies of previous studies (Kumawat et al., 2025; Li, Xi, et al., 2025), Li, Han, et al., 2025 structured keyword query was developed to identify publications related to AI technologies in tourism and hospitality contexts. The keyword selection reflected the evolution of AI research streams, encompassing established technological domains (e.g., robotics and automation) and emerging paradigms (e.g., GenAI and LLMs). For WoS, the search field was set to Topic (TS), using the following query: "robot" OR "robotics" OR "artificial intelligence" OR "AI" OR "automation" OR "embodied agent" OR "service robot" OR "chatbot*" OR "LLM" OR "large language model*" OR "GenAI" OR "AIGC" OR "artificial intelligence generated content" OR "ChatGPT" AND "tourism" OR "hospitality" OR "travel" OR "hotel" OR "destination."

An initial search yielded 10,996 records. After applying filters for peer-reviewed journal articles (Article, Review Article), Social Sciences Citation Index (SSCI)-indexed journals, and English-language publications, the dataset was refined to 2063 records. Subsequently, 17 core journals were selected for inclusion: *Annals of Tourism Research*, *Asia Pacific Journal of Tourism Research*, *Current Issues in Tourism*, *International Journal of Contemporary Hospitality Management*, *International Journal of Hospitality Management*, *Journal of Hospitality and Tourism Management*, *Journal of Hospitality and Tourism Technology*, *Journal of Hospitality Marketing & Management*, *Journal of Hospitality & Tourism Research*, *Journal of Sustainable Tourism*, *Journal of Travel Research*, *Journal of Travel & Tourism Marketing*, *Tourism Economics*, *Tourism Geographies*, *Tourism Management Perspectives*, *Tourism Management*, and *Tourism Review*.

This deliberate concentration on top-tier core disciplinary journals aligns with established methodological practices in tourism bibliometric research, which prioritize theoretical density and domain specificity over broad keyword inclusion (Doborjeh et al., 2022; Nusair et al., 2019). The selection was based on the disciplinary scope of the journals, with the analysis restricted to outlets primarily dedicated to tourism and hospitality. Relevant research on AI, automation, and technology-mediated services published in service-oriented or adjacent disciplinary journals was therefore outside the predefined scope of the dataset. In bibliometric and science-mapping analyses, expanding the dataset to multidisciplinary or peripheral journals (e.g., general information systems or marketing) introduces substantial conceptual noise. Since terms such as "AI" or "automation" carry fundamentally different contextual meanings across diverse fields, integrating them dilutes the semantic network and distorts domain-specific keyword co-occurrence patterns. Therefore, this approach was adopted specifically to anchor the analysis within the core disciplinary discourse of tourism and hospitality, ensuring theoretical cohesion and comparability of the research. However, these stringent inclusion criteria may inadvertently omit certain tourism AI studies published in adjacent fields, such as information systems, consumer research, and general marketing (Koo et al., 2025; Pham et al., 2024). Consequently, the findings should be interpreted through the lens of this core disciplinary discourse.

This process resulted in a final WoS dataset of 883 articles. A similar procedure was conducted for Scopus, targeting the TITLE-ABS-KEY fields using the same search query. From an initial set of 24,632 records, filtering for peer-reviewed articles and English-language reviews yielded 10,065 documents. Applying the same 17-journal selection criterion yielded a final Scopus dataset of 807 articles. To ensure data quality and remove duplicates, the following preprocessing steps were performed. The Scopus and WoS datasets were standardized and merged. Duplicates were removed based on unique DOIs. For records lacking a DOI, a text-normalization procedure was applied, including converting titles to lowercase and removing whitespace and special characters, followed by a secondary deduplication based on the normalized titles. Subsequently, 1333 articles were retained for analysis.

3.1.2. Data analysis

In Phase 1, bibliographic coupling was used to analyze the knowledge structure of AI research in tourism and hospitality. It identified clusters in recent research by examining shared references between publications. A higher number of shared references indicated stronger coupling and greater topical similarity. Bibliographic coupling was particularly well suited to capturing the current knowledge structure and research flows in a field, as it reflected the accumulated body of literature. It enabled the quantitative visualization of core research groups and knowledge networks within a specific thematic domain (Ferreira, 2018). This study leveraged these capabilities to systematically map the knowledge structure of AI research through bibliometric maps generated using VOSviewer.

3.2. Phase 2: LLM-assisted theory and construct extraction

Phase 2 identified recurrent theories and empirical variables in the literature. Existing systematic reviews involve time-intensive data extraction processes, and LLMs have been proposed as an alternative to accelerate data extraction (Schroeder et al., 2025). As Shin and Kang (2023) highlighted, traditional bibliometric analyses often face limitations related to database constraints and subjective interpretation when identifying deeper knowledge structures within a large body of literature. To address the limitations of traditional bibliometric approaches, this study employed LLM-assisted information extraction. GenAI models can process large volumes of textual data and identify structural patterns within scholarly knowledge systems (Shin & Kang, 2023). Building on the structured information extraction framework using LLMs (Dagdelen et al., 2024), this study used LLMs to extract only explicitly stated theories and variables from abstracts and full texts, without interpretation.

3.2.1. Analytical scope and corpus selection

From the 1333 publications, studies unsuitable for identifying explicit theory–variable linkages (e.g., reviews, conceptual papers, or qualitative studies) were excluded. Only studies that explicitly reported theories and variables in their abstracts were retained (n = 426). Studies that employed big data analytics, demand forecasting, and algorithmic modeling were retained in the bibliometric dataset. These contributed to the bibliographic coupling analysis, which mapped the broader research structure of the field.

The finalized corpus was subjected to LLM-assisted information extraction using GPT-4o. It captured the core variables and explicit theoretical constructs from the abstracts of AI-related empirical studies in tourism and hospitality published since 2021. LLMs can function reliably as information extraction engines rather than as interpretive agents when applied under predefined output schemas and strict constraints (Dagdelen et al., 2024). Hence, the analytical procedure was divided into three sequential stages: extraction (identifying explicit theories and variables), normalization (aligning expressions), and interpretation (analyzing theory–variable structures).

3.2.2. Prompt design

Theoretical frameworks and research variables (constructs) were treated as separate and independent units to avoid conflation across analytical levels. Therefore, an extraction procedure was designed using two independent coding processes for theories and variables. A zero-shot prompting approach was adopted to ensure consistency and reproducibility in information extraction. Zero-shot prompting is a method in which an LLM performs a task based solely on task instructions, without being provided with labeled examples or demonstrations of the desired output format (Al Nazi et al., 2025; Dagdelen et al., 2024). Instead of relying on curated training examples, the model interprets tasks based on instructions and predefined extraction rules embedded in the prompt. This approach was selected because the objective of this study was to systematically identify explicitly stated theoretical frameworks and research variables across a large corpus of abstracts without introducing researcher bias through example-based prompting (Al Nazi et al., 2025). Tables 3 and 4 present the protocols used in the analysis.

Table 3
Prompt protocol for LLM-based theoretical framework extraction.

SYSTEM PROMPT
You are an academic research assistant specializing in tourism and hospitality research.
Your role is strictly limited to theory identification and extraction.
Do NOT interpret, merge, evaluate, or reclassify theories.
USER PROMPT
[Task]
From the abstract below, extract ALL explicitly named theories, models, or theoretical frameworks used to frame the study.
[Extraction Rules]
1. Extract ONLY formally named theories, models, or frameworks (e.g., "Technology Acceptance Model," "Social Presence Theory").
2. Preserve the exact terminology as it appears in the abstract.
3. If multiple theories are mentioned, list all of them separately.
4. Do NOT infer theories that are implied but not explicitly named.
5. Do NOT merge similar theories or re-label them.
[Exclusions]
- Variables or constructs (e.g., perceived usefulness, trust)
- Analytical lenses described without formal theory names
- General concepts or perspectives without explicit theoretical labeling
[Output Format]
- A bullet-point list of extracted theories
- One theory per line
- If no theories are explicitly mentioned, output: None
[Abstract]
{abstract_text}

Table 4
Prompt protocol for LLM-based variable/construct extraction.

SYSTEM PROMPT
You are an academic research assistant specializing in tourism and hospitality research.
Your role is strictly limited to extracting research variables and constructs.
Do NOT interpret, theorize, classify, or evaluate the extracted items.
USER PROMPT
[Task]
From the abstract below, extract ALL explicitly mentioned research variables
or latent constructs analyzed in the study.
[Extraction Rules]
1. Extract ONLY variables or constructs used in empirical or conceptual analysis.
2. Include psychological, behavioral, relational, organizational, and technological constructs.
3. Preserve the exact terminology as it appears in the abstract.
4. If similar constructs are mentioned separately, list them separately (do NOT merge).
5. Do NOT infer variables that are not explicitly stated in the text.
[Exclusions]
- Theories, models, or frameworks
- Measurement items or scale indicators
- Methodological terms (e.g., regression, reliability, validity)
- Sample descriptors (e.g., age, gender, nationality)
- Purely contextual labels without conceptual meaning
[Output Format]
- A bullet-point list of extracted variables
- One variable per line
- If no variables are explicitly mentioned, output: None
[Abstract]
{abstract_text}

3.2.3. Variable normalization and human-in-the-loop validation

A subset of abstracts was manually reviewed to validate the LLM outputs (Lin, 2025). The extracted variables showed a tendency for the same theoretical constructs to appear in different linguistic forms. Normalization was applied to avoid duplication caused by linguistic variation (Dagdelen et al., 2024; Schroeder et al., 2025). It combined a rule-based procedure with human-in-the-loop validation. Python scripts aligned morphological variations, and semantically equivalent variable expressions were consolidated through consensus among the researchers (e.g., perceived usefulness, perceived utility, intention to adopt, and intention to use). The consolidation criterion was limited to semantic equivalence at the expression level rather than theoretical appropriateness or causal interpretation.

To further prevent potential hallucinations and unsupported inferences during the extraction process, a zero-shot, strict extraction schema was adopted to only variables and theories explicitly stated in the abstracts. Negative constraints were also applied to prohibit the model from independently inferring or generating information beyond the source text (e.g., Do NOT infer variables that are not explicitly stated in the text."). All LLM-extracted variables and theoretical expressions were manually verified by the researchers through a comprehensive review of the dataset. Each extracted item was compared with the original abstract. During this process, extraction errors, inconsistent terminology, and inappropriate classifications were corrected through iterative review and refinement.

The comparison between the LLM-extracted items and the results of manual verification demonstrated a high level of consistency, with an agreement rate of approximately 97%. This rate was calculated by dividing the number of LLM-extracted variable items confirmed as valid by the researchers by the total number of variable items initially extracted by the LLM and multiplying the result by 100. Semantically equivalent expressions were counted as matches even when their wording differed, provided that they referred to the same study variable (e.g., "attitudes toward the chatbot" and "attitudes" when the latter

explicitly referred to the chatbot). In contrast, items that referred only to the research context rather than variables examined in the study were classified as incorrect extractions (e.g., "AI services" when mentioned solely as contextual information).

The researchers corrected the extraction errors and inconsistent terminology identified during manual verification. Two human coders then independently re-examined any unresolved cases. Disagreements regarding the classification of an item were resolved through discussion until consensus was reached. All normalization rules were defined before the analysis and were not modified post hoc. Using these rules, variables and theories were systematically consolidated into higher-level categories (Appendices A and B).

3.2.4. Variable-to-theory mapping and visualization

To explore the coupling structure between theories and variables reported in the literature, a Sankey diagram was used. A Sankey diagram is a flow-based visualization technique that represents relationships and the relative magnitudes of connections between categories through directional links whose widths correspond to the strength or frequency of those connections. Sankey diagrams have been increasingly used in literature reviews and bibliometric analyses to illustrate complex relationships among research elements, such as links between theories, methods, variables, and thematic clusters (Bafadhal et al., 2025; Fathima Ms et al., 2024). In this analysis, a single theory–variable link represented a case in which a specific theoretical framework and variable were reported together within a single paper, indicating co-reference at the document level. The extracted theory and variable data from each paper were organized, and instances in which a theory was not explicitly reported were coded as "None." The dataset was converted to a long format so that all co-occurring theory–variable pairs were included in the analysis, including cases in which multiple theories were reported within a single paper.

Subsequently, the frequency of each theory–variable pair was calculated. To prevent coincidental or one-off connections from being overemphasized in the visualization, a minimum occurrence threshold (MIN_COUNT = 3) was applied, focusing the analysis on relationships that appeared repeatedly. A Sankey diagram was generated with theories on the left and variables on the right, and the link thickness was set to reflect co-occurrence frequency. Layout parameters, including node spacing and link thickness, were adjusted to optimize readability.

3.3. Phase 3: Qualitative insights from industry experts

3.3.1. Data collection

To empirically examine the gap between scholarly discourse and industry practice, semi-structured, in-depth interviews were conducted with 18 Korean industry leaders who directly implemented and managed AI in the tourism and hospitality sector. Participants included AI service planners, tourism technology venture CEOs, technology developers, and operations managers with hands-on experience in organizational AI projects. Interviews were conducted between June and August 2025 using a combination of in-person and online sessions, each lasting approximately 50–70 min. The semi-structured interview guide covered several topics, including AI development and applications in tourism organizations, operational challenges associated with AI implementation, organizational impacts, user experience and engagement, and the prospects of AI in the tourism and hospitality industry (Table 5).

Snowball sampling was used to ensure diversity across roles and sectors. To mitigate potential sampling bias, participants were drawn from diverse organizational roles and industry segments (e.g., hotels, travel agencies, AI solution providers, and mobility platforms). Referrals were cross-checked to avoid overrepresentation from the same organizational networks (Table 6). All interviews were audio-recorded and transcribed with the participants' written consent. To ensure analytical reliability, each transcript was independently reviewed and coded by at least two researchers, and discrepancies were resolved through discussion and consensus. This enhanced the credibility and consistency of the qualitative analysis and supported a systematic and empirical understanding of AI integration practices within the tourism and hospitality industry.

3.3.2. Data analysis

The collected interview data were analyzed using thematic analysis, which identified key industry issues and compared them with the results from Phase 2. This analysis identified over-researched domains that have been extensively studied in academia and under-researched domains considered important by industry practitioners yet insufficiently addressed in the literature. Two researchers independently coded the interview transcripts to ensure reliability and validity. Discrepancies between the coders were resolved through discussion and consensus. A predefined codebook established clear criteria for key themes and subcodes before the analysis, and no arbitrary addition or deletion of codes occurred during the process. Additionally, a member-checking procedure was conducted by sharing the key findings and identified themes with selected participants to validate the results against their lived experiences. Triangulation was employed by comparing the Sankey diagram-based knowledge structure from Phase 2 with the interview data, thereby verifying the alignment between academic discourse and industry perspectives and enhancing interpretive credibility. This provided an empirical diagnosis of epistemic gaps in tourism AI research.

Table 6
Profiles of the interview participants.

No.	Gender	Age	Business Type	Interview Duration
1	Female	40s	Travel content creation	56 min
2	Female	40s	Local travel packages	46 min
3	Male	50s	Travel AI solutions	47 min
4	Male	50s	Hotel technology development	64 min
5	Male	40s	Full-service travel agency	54 min
6	Male	40s	Inbound travel agency	65 min
7	Male	40s	Hotel management	57 min
8	Male	30s	Travel content creation	60 min
9	Female	40s	Travel AI solutions	48 min
10	Male	40s	Outbound travel agency	54 min
11	Male	40s	Travel digital content	46 min
12	Female	50s	Outbound travel agency	58 min
13	Male	50s	Travel mobility platform	49 min
14	Female	40s	Inbound travel agency	52 min
15	Female	40s	Local travel packages	62 min
16	Male	50s	Hotel technology development	44 min
17	Male	40s	Travel digital content	49 min
18	Female	30s	Travel AI solutions	57 min

Table 5
Interview questions.

Questions
- Could you describe your experience with using AI in tourism or hospitality operations?
- How has the introduction of AI affected your organization's services, workflows, or interactions with customers?
- What kinds of challenges or unexpected situations have you encountered when working with AI technologies?
- From your experience, what factors influence whether AI works well or poorly in tourism settings?
- How do you see the role of AI evolving in the tourism and hospitality industry in the future?

4. Results

4.1. Bibliographic coupling of documents analysis

Bibliographic coupling analysis was conducted on 1333 documents to identify the macro-level knowledge structure. Fractional counting was used to control for co-authorship bias. Fig. 1 visualizes the results. The analysis identified four major research clusters.

The red cluster centers on the impact of the physical and social attributes of robots and AI systems on human emotional responses and attitude formation. Research in this cluster primarily draws on psychological constructs, such as robot preference, anthropomorphism, intimacy, and emotional attachment, to account for human–technology interactions. Kim et al. (2021) showed that preference for robots increased during the pandemic, while Yoganathan et al. (2021) and Lv et al. (2022) found that anthropomorphism and perceived cuteness heightened tolerance for service failures. However, these studies primarily illuminate technology as a stimulus or a conduit that regulates human emotions and attitudes, embodying the core values of a digital humanistic approach that steadfastly maintains human-centered ethics and evaluative authority. Nevertheless, such psychological approaches leave room for further addressing the infrastructural mediating mechanisms through which advanced algorithms shape choice architectures and organize visibility.

The blue cluster encompasses research focused on GenAI, smart systems, and platform-based ecosystems, framing technology as a core component of industrial ecologies. Dwivedi et al. (2024) and Carvalho and Ivanov (2024) emphasize the transformative role of GenAI in tourism services. Buhalis et al. (2023) extend this view by conceptualizing digitally enhanced ecosystems that support hybrid experiences and value co-creation. This trajectory signals a partial shift toward a transhumanist perspective that technologically augments human capabilities, capturing significant technological potential. Hence, if future research systematically integrates structural effects and sociotechnical conditions, such as infrastructure disparities, technical debt, platform dependencies, and the redistribution of decision-making authority, it will more deeply elucidate the dynamics of co-evolution within the ecosystem.

The green cluster encompasses studies that emphasize crisis response, resilience, system efficiency, and human–machine collaboration, foregrounding discourses of coexistence. Pillai et al. (2021) introduced the concept of "Hospitality 5.0," demonstrating human–machine synergies that enhance hygiene, safety, and efficiency. Grundner and Neuhofer (2021)) examined the bright and dark sides of value creation in technology-mediated service environments. These studies cogently demonstrate the managerial value of complementing human labor and establishing harmonious collaborative frameworks. While maintaining the strengths of the traditional framework, in which empirical analysis primarily concentrates on human evaluation and performance outcomes, future research could address the multi-layered structure of collaboration more richly. This can be achieved by integrating a relational investigation into how technology physically and operationally reconfigures behavioral conditions and service environments.

The yellow cluster comprises computational studies focused on big-data analytics, demand forecasting, and algorithmic modeling. Li et al. (2021) and He et al. (2021) developed and validated AI models to improve predictive accuracy and support decision-making, positioning technology as a computational tool. This paradigm has achieved significant success in maximizing the operational utility of data-driven predictions. Furthermore, extending this approach toward theoretical reflections on the structural impacts of AI on organizational architectures and long-term experiential environments will enable more multi-dimensional knowledge generation.

Although the four clusters reflect thematic diversity and technological evolution, the structural configuration of theories and variables exhibits a pronounced tendency to explain the impacts of AI based on human users' cognitions, attitudes, and behaviors. This overarching pattern suggests that tourism AI research advances predominantly through human-centered explanatory frameworks, leaving approaches that explore the relational and constitutive roles of AI relatively marginalized. Concepts such as human–machine coexistence, co-evolution, and assemblage appear. However, empirical study designs remain dependent on human-centered variables drawn from the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology (e.g., adoption intention, perceived usefulness, attitude, trust). This reveals a structural misalignment between conceptual discourse and methodological practice.

Hence, bibliometric coupling analysis shows that, despite the quantitative growth of AI research in tourism and hospitality, the field has yet to fully engage with perspectives that consider the redistribution of agency or the reconstruction of meaning-making structures. The current research landscape remains situated between a digital humanism-oriented control model and a limited transhumanist expansion. However, this conceptual horizon could be significantly broadened by embracing normative ontological perspectives that capture the material entanglements between humans and technology while steadfastly safeguarding human-centered ethical values.

4.2. LLM-assisted theory and construct extraction results

While bibliometric analysis is highly effective for mapping the

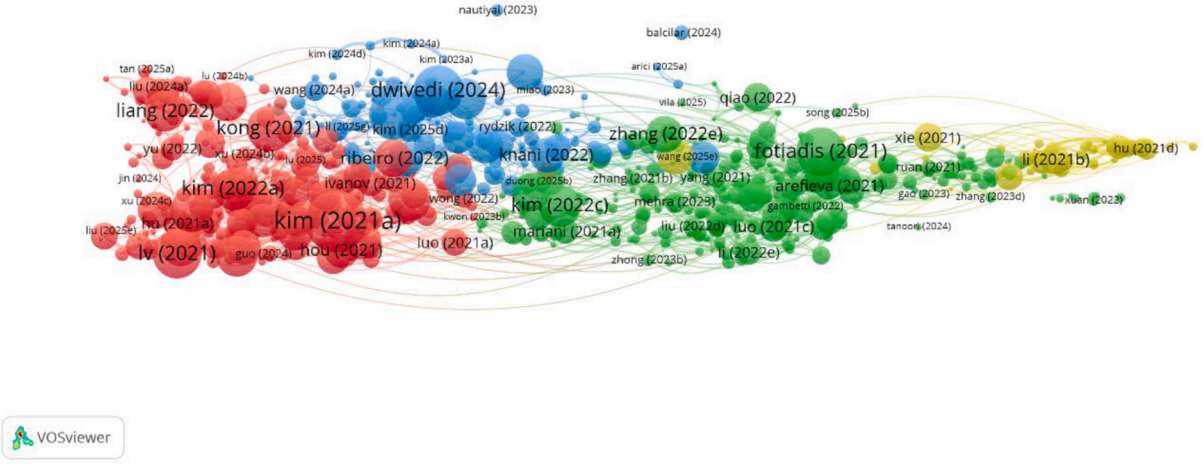


Fig. 1. Network visualization of bibliographic coupling of documents.

frequencies and relational structures of specific theories and keywords, it falls short of directly elucidating how these structures repeatedly reproduce underlying ontological assumptions. For instance, although the high prevalence of the Technology Acceptance Model can be readily verified, how this model configures AI in relation to human agency remains analytically obscured. To bridge this gap, the present study implemented an LLM-based theory–variable extraction technique. This approach moved beyond frequency validation to systematically trace the specific explanatory logics and variable trajectories through which individual studies structure human–AI relationships. While bibliometric analysis delineates the macro-level structure of the research field, the LLM-based analysis dissects the latent ontological and epistemological premises embedded within it.

Through LLM-based information extraction, 2013 variable expressions were extracted and consolidated into 30 categories (Appendix A). Of the 426 papers, 184 did not report theories, and the remaining papers yielded 327 theory instances. For visualization and structural interpretation, the extracted theories were normalized into seven overarching categories, focusing on those frequently invoked in AI and technology acceptance research. Appendix B provides the classification system and list of included theories. The normalized variable data formed the basis for visualizing the theory–variable structure using a Sankey diagram (Fig. 2).

Fig. 2 illustrates an asymmetric structure in which flows concentrate from a small number of theoretical categories toward a large number of variable categories. Based on the theory-variable linkages identified in the Sankey diagram, the seven theory categories were further organized into three higher-order theoretical domains—individual cognitive–behavioral theories, relational and social interaction theories, and organizational and system-level theories (Table 7). This higher-order grouping is based on the predominant conceptual focus and analytical level of the theories and variables, and is intended to provide an overarching theoretical structure for interpreting the heterogeneous linkages identified in the literature. Notably, the two dominant theoretical clusters—cognitive and information processing (342) and technology acceptance and innovation (266)—account for a substantial share of the overall landscape.

The three domains provide a conceptual organization of the identified variables according to their predominant analytical focus. The individual cognitive–behavioral domain primarily captures how individuals perceive, evaluate, and respond to AI, thereby emphasizing cognitive, affective, attitudinal, and behavioral processes at the individual level. The relational and social-interaction domain shifts the analytical focus from individual responses to the interpersonal and relational processes through which AI is encountered, including interaction, communication, social influence, collaboration, engagement, and co-creation. The organizational and system-level domain extends the analytical focus further to the broader work, organizational, and

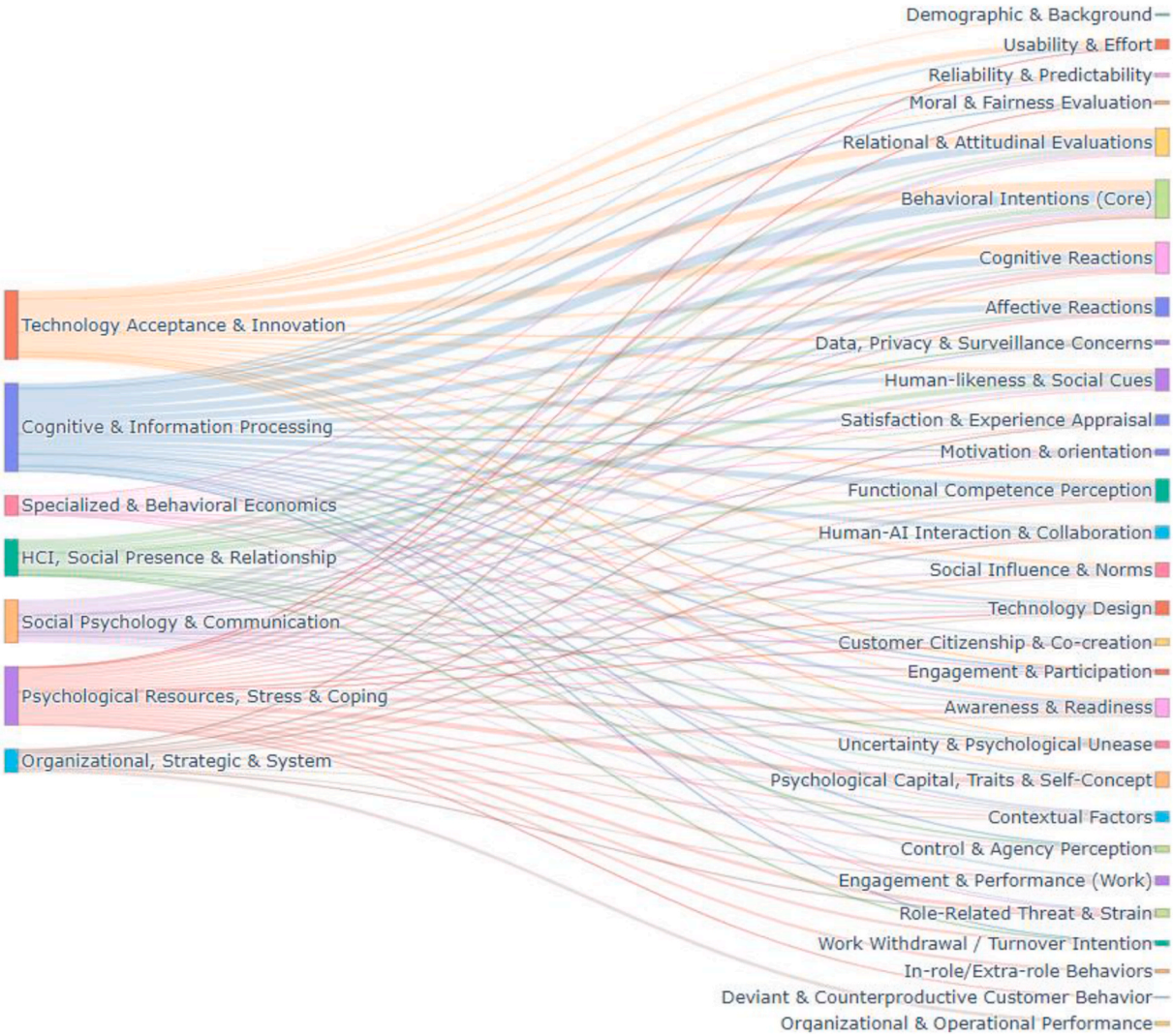


Fig. 2. A Sankey diagram of theoretical frameworks and empirical variables.

Table 7
Distribution of theory–variable linkages based on Sankey flow metrics.

Theoretical category	Theories	Outgoing flow	Total flow value	Variables	Ingoing flow	Total flow value
Individual Cognitive–Behavioral Theories	Technology acceptance & innovation	20	266	Demographic & background	1	6
				Usability & effort	3	38
				Reliability & predictability	3	14
				Morality & fairness evaluation	3	12
	Cognitive & information processing	25	342	Relational & attitudinal evaluations	6	107
				Behavioral intentions (core)	7	148
				Cognitive reactions	7	122
				Affective reactions	6	72
	Specialized & behavioral economics	15	77	Data, privacy, & surveillance concerns	4	16
				Human-likeness & social cues	6	86
				Satisfaction & experience appraisal	6	40
				Motivation & orientation	5	23
Relational & social interaction theories	Human–computer interaction, social presence, & relationship	17	141	Functional competence perception	7	88
				Human–AI interaction & collaboration	6	49
				Social influence & norms	5	55
				Technology design	7	53
	Social psychology & communication	19	165	Customer citizenship & co-creation	5	35
				Engagement & participation	5	20
				Awareness & readiness	7	71
				Uncertainty & psychological unease	5	27
Organizational & system-level theories	Psychological resources, stress, & coping	25	226	Psychological capital, traits, & self-concept	6	60
				Contextual factors	6	40
				Control & agency perception	4	24
				Engagement & performance (work)	4	34
	Organizational, strategic, & system	13	90	Role-related threat & strain	4	30
				Work withdrawal & turnover intention	3	18
				In-role & extra-role behaviors	1	12
				Deviant & counterproductive customer behavior	1	3
				Organizational & operational performance	1	14

contextual conditions in which AI is embedded, encompassing psychological resources, stress and coping, role-related processes, work behaviors, and organizational outcomes.

This is particularly important because the variables identified in the literature differ in their conceptual functions and levels of analysis, encompassing cognitive and affective evaluations, relational processes, behavioral responses, and organizational or system-level conditions and outcomes. Thus, higher-order domains provide a basis for systematically interpreting how different types of variables are connected to the theoretical approaches identified in the Sankey analysis. A critical empirical insight is that these theories do not represent indigenous explanatory frameworks newly developed within tourism studies. Instead, they are prominent theoretical frameworks widely utilized in adjacent fields, such as information systems and digital marketing (Ma et al., 2025). This finding suggests that tourism AI research largely extends existing technology adoption paradigms to explain AI rather than developing theoretical perspectives grounded in tourism-specific phenomena, such as experience, hospitality, and mobility. Consequently, AI is predominantly interpreted through human cognition, attitudes, and acceptance. Importantly, this does not indicate a limitation of the existing theories; instead, it highlights an opportunity to complement them with ontological perspectives that foreground AI's relational and constitutive roles.

4.2.1. Cognitive and information processing: the consolidation of digital-humanist epistemology

This theoretical cluster represented the largest flow within the network and functioned as a central axis for AI research in tourism and hospitality, connecting with a wide range of variable categories. It exhibited the highest number of outgoing connections (outgoing flow = 25) and the largest cumulative flow value (total flow value = 342). The structure was anchored in cognitive reactions (122), affective reactions (72), and behavioral intentions (148), demonstrating that explanatory pathways consistently converged on the transformation of perception into intention.

Ontologically, this cluster reflects a consolidated form of digital humanism that reinforces a human-as-judge hierarchy. AI-related attributes, such as information quality, perceived intelligence, and system performance, are not treated as independent analytical objects. Instead, they are systematically subordinated to human cognitive and affective evaluative structures, preserving the normative core of human authorship (Nida-Rümelin & Winter, 2023). Frameworks such as the stimulus–organism–response model, the elaboration likelihood model, and dual-process theory structure the analytical logic, positioning AI within a rigid architecture in which technology is optimized to conform to existing human cognitive models.

Zhu et al. (2023) employed cognitive consistency theory and the stimulus–organism–response framework to examine how perceptions of chatbots in online travel agencies shaped cognitive and affective states and purchase intentions. Ali et al. (2023) combined affordance realization theory with advertising credibility models to analyze how ChatGPT-based personalized travel recommendations influenced trust and behavioral intentions through relevance, reliability, usefulness, and perceived intelligence. Huang, Ozturk, et al. (2024) applied the expectation–confirmation model to predict continued use of AI services in hospitality, demonstrating that the confirmation of expectations, perceived enjoyment, and perceived performance determine satisfaction and reuse intentions. Wang, Guo, et al. (2025) combined the

stimulus–organism–response framework and inspiration transfer models to examine how ChatGPT information quality influenced travel planning behavior, identifying timeliness, relevance, and trust as key explanatory variables. These studies reproduce this structure by examining how AI-mediated stimuli influence perception and emotion, ensuring that meaning-making remains exclusively human and that AI operates strictly within the boundaries of human-centered control.

4.2.2. Technology acceptance and innovation: instrumental transhumanism and the primacy of functional augmentation

This cluster exhibited a high cumulative flow value (266), functioning as a central theoretical axis. Compared with the cognitive and information processing cluster, it connected to fewer variable categories, forming concentrated flows toward usability and effort (38), functional competence perception (88), and behavioral intentions (148). This stream was narrower yet more functionally intensive, oriented toward performance-driven outcomes. This configuration aligns with an instrumental form of transhumanism, in which AI is conceptualized as a co-evolutionary mediator that extends human biological and cognitive limits (Mayer & Mayer, 2025).

Parvez et al. (2022) found that perceived usefulness and perceived ease of use positively influenced employees' behavioral intentions toward robots. However, robots remain framed as managerial instruments for enhancing efficiency, with human–robot relationships interpreted as rational acceptance decisions rather than forms of coexistence or collaboration. Song et al. (2022) reported that perceived usefulness exerted a strong mediating effect on behavioral intention. However, social perception variables, such as enjoyment, exerted weak effects, and rapport and trust were non-significant, suggesting that human–robot interaction remained confined to immediate affective responses.

Said et al. (2024) integrated the Technology Acceptance Model with human-likeness variables to show that norms, output quality, usefulness, enjoyment, and ease of use affected reuse intentions. However, human-likeness was treated solely as a functional attribute that operated like a human. Kundan et al. (2025) found that ChatGPT enhanced travelers' intentions and confidence in foreign communication. However, AI continued to be positioned as an efficiency-enhancing tool. Hybridized agency and transformations of experiential structures remained unexplored.

Overall, the Technology Acceptance Model and its extensions reinforce human agency and control over technology by positing humans as the sole cognitive evaluators and ultimate decision-makers. However, within this performance-centric structure, complex mediating effects, in which judgment, emotion, and practice interact in a distributed manner with non-human actors during real-time service encounters, are theoretically backgrounded and often overshadowed by the focus on the final exercise of human judgment. These studies establish that behavioral intentions are driven by perceived usefulness, positioning tourists or employees as augmented subjects whose capabilities are technologically enhanced. However, this orientation remains limited to transhumanism, as the low frequency of ethical variables, such as morality and fairness (12) and data and privacy (16), suggests that, in contrast to the efficiency-centric functionalist expansion, there remains considerable room for more multifaceted reflection regarding the distribution of agency and the asymmetries of digital power.

4.2.3. Human–computer interaction, social presence, and relationship: anthropocentric relationality and simulated agency

This cluster was connected to human-likeness and social cues (86), relational and attitudinal evaluations (107), and human–AI interaction and collaboration (141), strongly emphasizing AI's relational dimensions. Tourism studies in this stream moved beyond functional evaluations to examine social presence and perceived companionship as key explanatory constructs. Ontologically, this cluster presents a paradox of anthropocentric relationality. Although it appears to approach the relational turn of posthumanism, relationality is instrumentalized to serve human-centered ends. Relational constructs function primarily as psychological mediators that trigger favorable human responses (Lei et al., 2021; Ng et al., 2026). Sociality is not treated as an emergent property of human–AI entanglement (Barad, 2007); instead, it is treated as a simulated feature—a social stimulus—that enhances user acceptance. By reducing relationality to a tool for enhancing satisfaction and trust, this research maintains the ontological primacy of the human subject, positioning social AI as a sophisticated mirror rather than an ontologically independent partner.

4.2.4. Psychological resources, stress, and coping: extension of threat perception and persistence of human-centered ontology

The psychological resources, stress, and coping cluster (226) introduced a qualitatively different orientation, extending AI research toward the affective and ethical tensions generated by technological expansion. This cluster encompassed variables such as uncertainty, role-related threats, and psychological capital, reflecting the vulnerabilities of the humanist subject in the face of algorithmic power. Ontologically, this cluster captures a critical point of friction, at which the humanist subject (e.g., travelers and hospitality employees) feels threatened by AI's growing agency. Empirical studies grounded in conservation of resources theory and coping frameworks reported that AI adoption exacerbated emotional exhaustion and role conflict, indicating a destabilization of the autonomous human agent (Khairy et al., 2025; Teng et al., 2024).

However, these studies primarily interpret structural shifts, such as the impacts of automated decision-making, through individual-level psychological variables and subjective coping mechanisms. This reflects an academic orientation that, while acknowledging AI as a source of uncertainty and disruption, explains its consequences primarily in terms of human adaptation, resilience, and coping. Ontologically, this suggests that human agency remains the principal locus of explanation, even as AI increasingly reshapes organizational and service environments. Consequently, this cluster reinforces a human-centered explanatory framework while leaving AI's relational and constitutive roles comparatively underexplored.

4.2.5. Social psychology and communication and organizational, strategic, and system: contextual expansion without systemic reconfiguration

The social psychology and organizational clusters extended the analytical scope by integrating collective and institutional contexts. Variables such as social influence, customer citizenship, and organizational performance reflected efforts to situate AI within a broader sociotechnical environment. Shin and Jang (2025) evaluated employees' compliance intentions and attitudinal ambivalence regarding corporate digital responsibility. They highlighted that AI and digital technologies operate beyond individual perception within organizational norms, trust, and institutional contexts. This research extends the understanding of technology adoption from a matter of individual choice to a process shaped by social relationships and norms within organizations. Saputra et al. (2024) grouped AI robots used in the tourism and hospitality industry into four types—chatbots, mechanoids, humanoids, and androids—based on anthropomorphism. They showed that each type performed distinct functional roles across different service contexts. Hence, AI is an entity that is deployed and ascribed meaning in diverse forms within social interactions and service structures.

From a digital humanism perspective, this configuration reflects an expansion of human-centered governance into organizational and institutional domains. Here, AI is positioned as an object of regulation, responsibility, and normative control. Simultaneously, elements of transhumanism are partially observable, as AI contributes to extending organizational capabilities and service performance. However, this expansion does not entail a redistribution of agency. Rather, it reinforces human-centered authority by embedding AI within existing structures of decision-making, accountability, and evaluation.

4.2.6. Synthesis: Structural stability of humanist premises and empirical limitations

Across the network, human-centered cognitive, attitudinal, and intentional variables—behavioral intentions (148), cognitive reactions (122), relational evaluations (107), and functional competence (88)—dominate. However, variables associated with power, responsibility, and ethical conflict—morality and fairness (12), data and privacy (16), and deviant behavior (3)—remain marginal. Collectively, the network reveals a field marked by a humanist stronghold that preserves a rigid subject–object divide. The cognitive cluster reinforces a digital humanist control model. The technology acceptance cluster reflects an instrumental transhumanism centered on augmentation. The human–computer interaction cluster introduces a simulated relationality that serves human-centered outcomes. The stress and coping cluster exposes emerging ontological tensions, while the social and organizational clusters expand the contextual scope without transitioning toward a relational or systemic epistemology.

The results indicate that digital humanism-oriented control models prevail. While limited transhumanist expansions exist, posthumanist notions of distributed agency and relational experience remain among the least integrated perspectives within current empirical structures. AI's potential to co-construct relationships and experiences with humans is constrained by the analytical design. Furthermore, ethical and social contextualization is only partially realized. Hence, this research aims to surface humanist assumptions and broaden the theoretical pathways for examining the redistribution of agency and the potential for relational co-constitution in tourism.

4.3. Thematic findings from industry interviews

Preceding bibliometric and LLM-based analyses effectively mapped the dominant theoretical structures and variable trajectories repeatedly reproduced in tourism and hospitality AI research. However, they remained inherently limited to the knowledge production structures internal to academic discourse. Extant literature largely conceptualized AI as a functional tool to augment human decision-making, anchored predominantly in human-centered explanatory frameworks, such as the Technology Acceptance Model, the Unified Theory of Acceptance and Use of Technology, and the stimulus–organism–response framework. However, the extent to which these discursive structures align with actual AI implementation and lived experience within industry operational environments remains an open and distinct question.

AI is introduced and adapted in a piecemeal fashion within organizational settings, operating under a complex web of institutional and technical constraints. Hence, this study conducted additional interviews with industry experts to interrogate the potential epistemological and ontological gaps between the AI conceptualization presupposed by academic discourse and its instantiation in professional practice. This provides supplementary managerial implications. Additionally, it exposes the ontological dissonance within tourism AI research by analyzing how the human-centered conceptualizations reproduced in academic discourse are negotiated, transformed, or contested when confronted with the realities of industry operations.

The analysis of the interviews produced 12 subthemes and six overarching themes (Table 8). These demonstrate that the human-centered theoretical frameworks pervasive in the extant AI literature are actively reconfigured within the complex interplay of organizational, technical, and institutional conditions. Hence, while the bibliometric and LLM-based analyses delineate the internal architecture of knowledge production within academic discourse, the interview-based analysis illuminates how such discourse is transformed and adapted within the exigencies of actual professional practice. Therefore, academic research remains firmly rooted in human-centered acceptance paradigms, repeatedly reproducing linear cognitive–attitude–behavioral intention pathways through technology acceptance, the Unified Theory of Acceptance and Use of Technology, and other technology-based explanatory frameworks. In contrast, industry practice occupies a transitional space in which functional humanism, limited transhumanism, and elements of technological autonomy coexist.

Table 8
Thematic analysis results.

Main themes	Middle themes	Subthemes
Epistemological gaps between technology and practice	Asymmetry between front-end and back-end systems	Overconcentration on AI-based curation services at customer touchpoints
		Persistence of manual processes in back-end reservation and ticketing
	Tensions between data optimization and business logic	Misalignment between algorithm-based recommendations and revenue models (e.g., subsidies)
		Limited capacity to reflect regional specificities and on-site contexts
Reconfiguration of organizational and labor structures	Job transition rather than job disappearance (shift)	Automation and decline of routine counter-based tasks
		Emergence of new roles in technology management, remote monitoring, and sales
	Efficiency tensions in labor-intensive industries	Resistance to technology adoption among aging frontline workers
		Generational gaps in digital tool usage between IT-native and older cohorts
Diagnosis of technological maturity within the industry ecosystem	Lack of foundational data and system infrastructure	Insufficient competitiveness of pre-GenAI technologies (e.g., SaaS)
		Limitations in training data due to fragmented domain-specific datasets
	Instrumental reduction of technology and platform lock-in	Perception of AI as an "add-on" rather than an independent innovation
		Marginalization of small ventures due to technological monopolization by large platforms

Notably, while AI-powered recommendations and curation are actively leveraged at customer-facing touchpoints, a robust dependency on human labor and legacy systems persists within core operational domains. These findings imply more than mere disparities in technological adoption. They reveal a fundamental divergence in how academic discourse and industrial reality conceptualizes AI's role and agency. Furthermore, this interview phase functioned as both a confirmatory procedure and a critical comparative validation process. It demonstrates that the human-centered adoption paradigm dominant in tourism AI research lacks the explanatory power to account for the complex, hybrid nature of AI experiences within actual industrial settings.

4.3.1. Epistemological gaps between technology and practice

In industry settings, AI is not perceived as an integrated, autonomous "intelligent innovation," as portrayed in academic discourse (Hahne & Schmoelz, 2026). Instead, it is experienced as a fragmented tool, selectively embedded within existing workflows (Islam et al., 2024). Interviewees noted that AI-enabled curation, recommendation, and information services are most visible in customer-facing (front-end) interfaces. However, back-end operations, such as reservation, ticketing, and settlement, remain heavily dependent on manual procedures and legacy systems, producing a partial translation (Shin, Jo, et al., 2026).

While the bibliometric analysis aggregated AI applications as instances of technological adoption and service innovation, the expert interviews highlighted significant frictions in implementation, including

data silos, reliance on legacy systems, and complex organizational adjustments. This demonstrates that the core challenge of AI integration lies in the process of organizational translation. Hence, it reveals that the human-centered technological control models assumed in academic discourse are, in practice, constrained by concrete operational conditions, such as data infrastructure, organizational architecture, and established workflow processes (Hahne & Schmoelz, 2026).

Technology is incorporated into human-centered structures without considerably disrupting or reconfiguring them (Serrano et al., 2024). These findings reflect a gap in AI technological maturity. Furthermore, they raise a profound ontological question regarding the conditions under which AI agency is constructed. In the current tourism industry, AI does not operate as an entity that displaces human capacity or possesses independent agency. Instead, it functions as a technologically mediated instrument that partially expands human operational performance within the existing sociotechnical fabric.

In the tourism industry, AI remains far from being a fully autonomous actor (Prem, 2024). While this creates space for limited transhumanist extension, posthumanist forms of distributed agency have yet to be fully realized. Expert interviews reveal that phenomena categorized as AI adoption in the existing literature are not singular, straightforward processes of technology acceptance. Instead, they are dynamic translation processes reconstructed through ongoing negotiations with organizational conditions and legacy systems. This suggests that AI agency is not an inherent property embedded within the technology. Instead, it is an emergent phenomenon arising from the relational entanglement among humans, data, and organizational infrastructure.

> "AI can be used for services that are recommended or displayed to customers externally. But, in terms of how we process data on-site, there hasn't been enough change to feel that AI has truly been implemented."

> "Even if packages are selected through curation, back-end processes, like airline ticketing and hotel bookings, are handled separately by staff."

4.3.2. *Reconfiguration of organizational and labor structures*

AI's perceived organizational impact diverges sharply between scholarly research and industry experience. Academic research often frames AI and robotic adoption in terms of job displacement or psychological resistance to technology (Wang, Cheng-Xi Aw, et al., 2025). However, interviewees emphasize qualitative shifts in work rather than simple job loss (Shin et al., 2025). Industry experts noted that while routine, standardized front-line tasks were in decline, new roles centered on managing, supervising, and calibrating AI-driven decision-making were emerging. This suggests that the dominant academic narrative of AI-induced job displacement is insufficient to capture the intricate organizational reconfiguration processes on the ground. Rather than a process of eliminating human labor, AI integration represents a continuous renegotiation of the boundaries between human and technological roles. Hence, experts experience AI as a relational technology that blends with existing job descriptions to forge new structural roles.

This reconfiguration signals a shift toward a limited, augmentation-oriented transhumanism, in which AI extends human cognitive and operational capacities while preserving human agency as the central locus of control (Schultz, 2025). Simultaneously, the emergence of new roles focused on AI monitoring and oversight reflects the rise of hybrid agency, in which responsibility and decision-making are distributed across human–technology assemblages. This aligns with the extended mind framework and posthumanist accounts of subjectivity (Schultz, 2025).

> "Only one counter staff member was dismissed, but several new roles for managing, monitoring, and sales emerged."

> "Technological advancement doesn't remove jobs – it creates different kinds of jobs. I don't feel that AI has taken work away."

These observations imply that organizational change involves a redistribution of agency and responsibility rather than simple job replacement. Intergenerational differences in digital literacy further complicate human–technology dynamics, shaping how power and expertise are distributed within organizations (Frascaria et al., 2026). From a posthumanist perspective, these shifts can be interpreted as a nascent manifestation of hybrid agency, in which the agency of human and technological actors remains indistinct and co-constituted within the specific organizational context (Braidotti, 2019).

> "People in their 20s are AI natives, but my generation still relies on old habits. We're more comfortable with Google searches than GPT and struggle to let go of them."

4.3.3. *Diagnosis of technological maturity within the industry ecosystem*

Interviewees emphasized that, before AI adoption, the tourism industry's digital infrastructure was insufficiently mature (Couderc, 2025). In the absence of standardized data, SaaS-based systems, and integrated platforms, AI was perceived as an add-on functionality rather than an autonomous innovation. Platform monopolies and the exclusion of small operators further created structural barriers to AI adoption (Shin, Jo, et al., 2026). Unequal access to technology and authority constrains the realization of digital humanism-oriented efficiency ideals (Serrano et al., 2024). Although AI, as a mediating mechanism, can reshape ontological hierarchies within the industry, it remains embedded in overlapping structures of human-centered control and limited technological autonomy. These constraints, rooted in regulatory structures, organizational control, and infrastructural dependencies, prevent AI from evolving into a fully autonomous or structurally transformative agent within the industry ecosystem.

Technological autonomy remains partial and uneven, reinforcing a hybrid configuration in which AI operates within layers of human oversight, infrastructural limitations, and emergent system-level coordination (Schultz, 2025). Such findings necessitate a critical reconsideration of technological determinism, which reduces AI advancement to improvements in algorithmic performance. Expert experiences suggest that AI functions as an ecological entity whose agency is actualized only when deeply embedded within data infrastructures, platform architectures, and regulatory frameworks.

> "Before discussing how GenAI could affect our industry, it's more important to evaluate how competitive foundational technologies like SaaS are domestically [used]."

> "The government supports large companies like Yanolja, but small operators like us keep borrowing to stay afloat and eventually go out of business."

4.4. *Gaps between academia and industry*

The cross-analysis of academic literature and expert interviews exposed a profound structural discrepancy between the human–technology relationship presupposed in tourism and hospitality AI research and the actual ontological status of AI as experienced in professional practice. Academic discourse remains anchored in human-centered adoption paradigms, continually reproducing linear explanatory structures—cognition → attitude → behavioral intention—based on the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology (Islam et al., 2024; Shin, 2022). In contrast, industry practice occupies a hybrid, transitional space in which functional humanism, limited transhumanism, and emerging technological autonomy intersect (Shin, Jo, et al., 2026). This gap stems from divergent assumptions about how AI is ontologically positioned (Hahne & Schmoelz, 2026).

In academic research, AI is conceptualized primarily as a stimulus or service agent whose significance is produced through human cognitive processes (Kim et al., 2027; Wang, Guo, et al., 2025). Variables such as functional excellence, perceived usefulness, user satisfaction, and behavioral intention implicitly position AI as an object or mediator of human judgment (Prem, 2024). This configuration aligns with the digital humanism-oriented control model, in which advanced technology does not displace meaning attribution and responsibility from humans (Nida-Rümelin & Winter, 2023).

However, in industry practice, AI is experienced less as an integrated autonomous intelligence and more as fragmented automation selectively embedded within existing workflows (Serrano et al., 2024). At the customer interface, recommendations, curation, and chatbots are visible, yet core back-end operations, such as reservation, ticketing, and settlement, remain dependent on manual labor and legacy systems. This demonstrates that, contrary to the integrated AI actor assumed in academic models, practical AI is partially translated and reconfigured through its interaction with organizational infrastructure (Shin et al., 2025, 2026a). Hence, technology functions as an element integrated within human-centered structures while partially modifying them (Torres-Martínez, 2025).

Furthermore, the tension between algorithmic optimization and practical business logic challenges assumptions of technological neutrality. Tourism research often considers recommendation accuracy, personalization, and predictive performance as the core indicators of AI's capabilities, assuming that data-driven optimization inherently enhances rationality (Prem, 2024). The preceding analysis, particularly the findings from the technology acceptance and cognitive processing streams, suggests that algorithmic outputs are closely linked to improved decision-making outcomes. However, within the practical context of industry operations, these outputs are heavily constrained by structural factors, including platform-centric market dominance, limited technological access among small-scale operators, and broader inequalities related to organizational survival (Shin, Jo, et al., 2026). Thus, technological agency intersects with the agency of capital and policy, destabilizing linear adoption pathways (Frascaria et al., 2026). Consequently, AI operates as a conditional mechanism that pre-arranges choice architectures. It offers a nascent form of posthumanist distributed agency while exposing a hybrid configuration in which human-centered control persists (Braidotti, 2019; Latour, 1996).

Labor restructuring in tourism and hospitality complicates reductive human–technology dichotomies of replacement versus resistance. The interviews reveal qualitative shifts in work—repetitive counter tasks decrease, while new positions in system management, supervision, and data operations emerge. These shifts represent a redistribution of roles and responsibilities rather than straightforward job displacement (Brusseau, 2023). Hence, AI is experienced as a mediating structure that recalibrates job definitions and competencies. Notably, intergenerational differences in digital literacy operate as structural variables that influence organizational power and expertise, rather than merely shaping attitudes toward technology adoption.

Platform-centric AI diffusion is reconfiguring hierarchies at the ecosystem level. Large platforms consolidate data and algorithms, emerging as central actors within the ecosystem. However, small operators encounter structural dependency due to limited access to technology and infrastructure (Shin & Baek, 2023; Shin, Jo, et al., 2026). This dynamic shows that AI functions as a mediating structure, rearranging ontological hierarchies within the tourism industry. Concurrently, AI is often perceived as an "add-on" feature, with underdeveloped foundational data infrastructure constraining adoption. Therefore, technological autonomy and human-centered control coexist in an overlapping, non-exclusive configuration.

These empirical findings expose the limitations of tourism AI research as a consequence of theoretical saturation within the human-centered adoption paradigm. Existing studies frame AI and technology as an external tool that supports human decision-making, repeatedly reaffirming the linear cognition–attitude–behavior sequence (Jiménez-Barreto et al., 2021; Jo & Shin, 2026; Wang, Guo, et al., 2025; Zhu et al., 2023). However, industry practice demonstrates that AI operates as a relational element entangled with humans, organizations, policies, and data infrastructures, functioning as a condition that pre-structures experiences, values, and power structures. Nonetheless, ethical and social value realization remains limited. Furthermore, the potential for digital or transhumanist augmentation has yet to be meaningfully incorporated into theoretical or empirical frameworks. This perspective highlights the need for expanded theoretical lenses to capture human–technology–organization entanglement and distributed agency.

5. Propositions for expanding the theoretical horizons of tourism AI research

The bibliometric coupling analysis and theory–variable mapping conducted in this study showed that current AI research in tourism and hospitality was heavily grounded in a human-centered instrumentalist perspective. The dominance of psychological acceptance models led to the consistent treatment of AI as an exogenous technological stimulus, restricting its role to shaping user perceptions and behavioral intentions (Islam et al., 2024; Wang, Guo, et al., 2025). This framing potentially obscured the structural and constitutive functions that AI performed in shaping tourism systems (Tussyadiah, 2020). Interviews with industry practitioners revealed emerging dynamics that linear, human-centered models failed to capture, including the integration of human and algorithmic judgment, the reorganization of labor roles, and growing asymmetries in platform power linked to data and AI capabilities.

Rather than operating solely as task-specific tools, AI systems are evolving along three interrelated trajectories.

(1) Agentic systems capable of autonomous planning and execution
(2) AI-embedded infrastructures that coordinate pricing, allocation, and transactions across platforms
(3) Physically and operationally integrated AI that shapes interactions within service environments

Collectively, these developments signal a shift from AI as a tool toward AI as a structuring condition for action within tourism systems (Tussyadiah, 2020). However, it is necessary to clarify the discourse regarding AI's subjectivity and agency within this evolutionary process. While AI exhibits motivations and intentions (Garvey et al., 2023), auto-completion capabilities (Williams-Ceci et al., 2026b), and empathy (Liu-Thompkins et al., 2022), these are largely the results of model training and the simulation of behavioral cues. Hence, this does not imply that AI possesses accountability or the capacity for ethical judgment (Liu-Thompkins et al., 2022).

Therefore, rather than presupposing essentialist agency or intentionality inherent within the technology, this study distinguishes between the relational agency effects emerging within the human–AI–platform assemblage and the perceived cues of agency that lead humans to interpret AI systems as intentional, social actors. The AI agency discussed in this paper is a relational and distributed effect constructed and perceived through sociotechnical interaction. Such relational and structural shifts are difficult to capture using traditional psychology-centric explanatory frameworks, necessitating the integration of alternative ontological perspectives to complement existing models.

To reconcile the ontological discrepancies between academia and industry and enhance the conceptual depth of tourism AI research, this section proposes three directions for future inquiry, grounded in the humanist spectrum, along with corresponding propositions. The logical framework linking the empirical findings of this study, comprising bibliometric analysis, LLM-based theory and variable extraction, and expert interviews, to the derivation of specific propositions is illustrated

in Fig. 3.

5.1. Normativity of digital humanism: From technical efficiency to structural reconfiguration

When AI restructures the tourism ecosystem under the rhetoric of efficiency and optimization, digital humanism highlights the accompanying structural reordering and redistribution of responsibility (Serrano et al., 2024). The interviews reveal platform concentration, deepening technological dependency among small operators, and widening disparities in data access. These indicate that AI adoption is a matter of not only enhancing productivity but also reallocating decision authority and resource distribution within the tourism industry.

Therefore, AI operates as a mediating infrastructure that shapes information visibility, recommendation exposure, and transactional flows, reorganizing the operational conditions of the tourism ecosystem (Shin et al., 2026). Accordingly, tourism research must move beyond human-centered acceptance paradigms and examine how AI reconfigures institutional roles, accountability structures, and systemic dependencies. Within this broader transformation, algorithmic governance should be considered a concrete expression of infrastructural power. Governance is enacted through multiple AI-mediated mechanisms—ranking algorithms, pricing logics, and platform coordination tools—that collectively structure decision environments and raise broader concerns about the alignment and oversight of increasingly autonomous AI systems (Russell, 2021).

Moreover, as general-purpose AI systems capable of cross-domain reasoning and integrative decision-making emerge, AI increasingly operates as an infrastructural layer that coordinates tourism flows, pricing, and market access across platforms. This development does not diminish the human-centered concerns of digital humanism; it amplifies them. As decision processes become embedded within AI-mediated systems that span organizational and functional boundaries, decision-making authority shifts from visible human actors to less transparent algorithmic arrangements (Russell, 2021). Hence, from a digital humanist perspective, the critical issue is the conditions under which

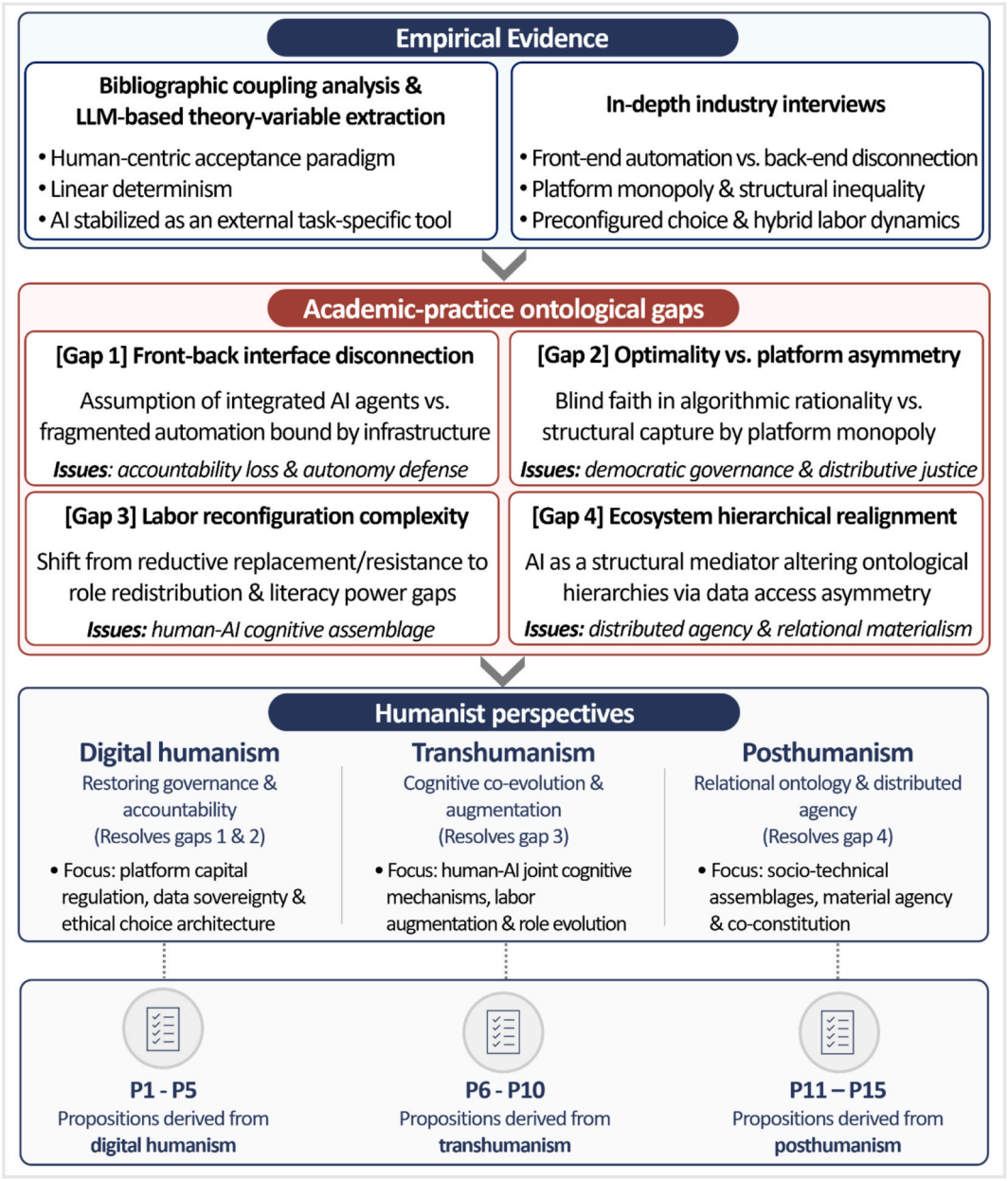


Fig. 3. Research framework linking empirical evidence to the humanist spectrum and research propositions.

human agency is preserved, mediated, or constrained within these evolving systems. Instead of treating AI as an external tool subject to ethical assessment, digital humanism must investigate how AI-mediated infrastructures reshape autonomy, accountability, and participation. Accordingly, the normative focus shifts from evaluating isolated ethical concerns (e.g., trust, fairness, and privacy) to examining how AI reorganizes the structural conditions under which human-centered values can be enacted (Russell, 2021).

Future research must move beyond measuring tourist attitudes or perceived usefulness to empirically analyze how AI-mediated infrastructure reconfigures accountability, control, and decision authority. For instance, scholars should investigate how tourists attribute responsibility among AI, human staff, and platforms during service failures or how the introduction of algorithmic operating systems alters employee autonomy and supervisory experiences (Kong, Zhao, et al., 2024; Yin et al., 2024). Furthermore, as AI-driven personalization and automation expand, critical research themes emerge around shifting perceptions of fairness, transparency, explainability, and the human touch. For example, it is vital to examine the extent to which tourists perceive AI-based dynamic pricing or recommendation systems as fair or whether human interaction is re-evaluated as a premium experience providing emotional security in AI-centric service environments.

Additionally, researchers could explore how AI operating systems affect the visibility, bargaining power, and data accessibility of small-scale tourism operators and how algorithmic platform environments influence the diversity and inclusivity of local tourism ecosystems. These issues can be investigated through scenario-based experiments that manipulate the levels of AI decision authority, explainability, and algorithmic intervention. Furthermore, they can be examined through multi-method designs that integrate organizational interviews with case studies to analyze power realignments and institutional tensions. By leveraging platform data, digital behavioral logs, and operational process analytics, researchers can conduct more structural explorations into how AI reconfigures information flows and decision-making architectures within the tourism ecosystem. Hence, this study makes the following propositions.

Proposition 1. *Algorithmic optimality should be understood as both a technical property and a sociotechnical and infrastructural construct. These shape destination visibility, recommendation processes, and decision environments.*

Proposition 2. *AI-preconfigured tourism choice environments (e.g., destination recommendations and itinerary sequencing) reshape tourists' autonomy and opportunities. This allows serendipitous discovery by structuring choice architectures throughout the travel journey.*

Proposition 3. *Data sovereignty and privacy should be theorized as both technical safeguards and ethical conditions governing the extraction and use of tourists' behavioral data and personalized travel recommendations, through which autonomy and self-determination are materially enacted within AI-mediated tourism infrastructures.*

Proposition 4. *Hierarchical transformations induced by AI adoption should be conceptualized as shifts in power relations and infrastructural inequalities embedded in the relationships between global platform operators and local tourism actors (e.g., accommodations, guides, and destination-level service providers). These require ethical interventions grounded in fairness, inclusiveness, and distributive justice.*

Proposition 5. *The extent to which AI-mediated tourism infrastructures embed human-centered values, such as diversity, fairness, transparency, accountability, and well-being, is expected to influence the preservation of meaningful human agency in tourism ecosystems.*

5.2. Transhumanist expansion: From tool use to hybridization of subjective capabilities

Transhumanism posits the technological extension of human capacity as its core premise (Brusseau, 2023). However, current tourism AI research primarily interprets this through a functional lens, focusing on efficiency and convenience. Existing studies based on the Technology Acceptance Model conceptualize AI as an auxiliary tool supporting human decision-making. However, our findings suggest that AI is more than a support system. In industrial practice, AI operates by actively reconstructing the fundamental processes of human judgment, information searching, memory, and decision-making. Specifically, GenAI-driven recommendation systems, automated itinerary construction, and real-time information curation penetrate tourists' cognitive structures, establishing an environment of co-decision-making between humans and AI.

These shifts necessitate moving beyond the traditional view of tourism as a process in which humans use technology. Tourists can no longer be viewed solely as independent decision-makers. Rather, they are augmented subjects whose cognitive capacities are inextricably linked to AI interaction (Schultz, 2025). This represents not only a matter of technology acceptance but also a new form of cognitive co-evolution, in which human judgment and the computational logic of technological systems are coupled. This augmentation introduces new asymmetries in power and dependency. Persistent reliance on specific platforms and algorithms risks eroding human exploratory capacity and autonomous judgment, limiting the diversity of the tourism experience (Frascaria et al., 2026; Williams-Ceci et al., 2026b). Thus, a transhumanist perspective must expand to explore how human capabilities and technological systems are mutually reconstructed.

Furthermore, the advancement of GenAI and general-purpose AI systems is deepening the human–technology nexus. AI is evolving beyond information provision to predict preferences, pre-structure choice sets, and adjust emotional responses. Hence, tourism experiences are co-constructed through continuous interaction with AI instead of being formed independently within the human mind. Thus, future tourism AI research must investigate how this augmentation of human capacity transforms the structure of the tourism experience and how such transformation influences human autonomy and identity.

This transhumanist turn presents new research frontiers for empirically analyzing the human–AI cognitive assemblage. Future research could examine how GenAI recommendation systems impact exploratory behavior, memory formation, and decision-making processes. Furthermore, researchers can analyze how varying levels of AI dependency alter the balance between autonomous judgment and experiential diversity. Beyond GenAI, emerging technologies, such as wearable devices, AR interfaces, real-time translation systems, context-aware assistants, and agentic AI, extend tourists' perceptual, linguistic, cognitive, and behavioral capabilities through continuous interaction with physical and digital environments. These technologies fundamentally reshape how tourists perceive, interpret, and engage with destinations, transforming tourism experiences through capability augmentation. Moreover, these technologies increasingly become integral components of tourists' cognitive processes, enabling new forms of navigation, cultural understanding, communication, and adaptive decision-making that would otherwise be difficult or impossible to achieve. Additionally, these AI-enabled systems broaden search horizons. They diversify tourism experiences by exposing travelers to destinations, activities, and cultures beyond their existing preferences. Furthermore, they raise important questions regarding dependency, cognitive offloading, and the long-term transformation of human capabilities. Hence, this study makes the following propositions.

Proposition 6. *Tourism decision-making increasingly emerges from human–AI co-decision processes that augment and redistribute cognitive and behavioral capabilities.*

Proposition 7. *AI-mediated tourism systems function as capability augmentation mechanisms that extend tourists' perceptual, linguistic, cognitive, and behavioral capacities beyond unaided human abilities.*

Proposition 8. *Tourists' intuition and judgment increasingly emerge as AI-augmented cognition, co-produced through continuous interaction with predictive systems that shape destination choice, price evaluation, and expectation formation.*

Proposition 9. *Tourism subjectivity is increasingly technologically extended across AI-curated itineraries, virtual destination representations, and platform-based self-presentations. This forms a hybrid identity in which experiential perception and self-concept are co-configured by human and algorithmic inputs.*

Proposition 10. *Agentic AI systems function as augmentative infrastructures that expand and reconfigure tourists' decision-making capacities by autonomously coordinating information, recommendations, and tourism-related actions across service ecosystems.*

5.3. Posthumanist turn: From human-centered experience to distributed agency

Traditional tourism research conceptualized experience as a self-contained psychological state, modeled through emotional and cognitive outcomes, such as satisfaction, immersion, memory, and loyalty (Kim, Kim, et al., 2025; Song et al., 2025). Similarly, most AI studies relied on linear acceptance models (the Technology Acceptance Model and the Unified Theory of Acceptance and Use of Technology), framing AI as a technological object that affects human attitudes and behavioral intentions (Li, Li, et al., 2025). While these approaches significantly contributed to explaining user experience and adoption processes, they offered only limited insights into how AI reconfigures the conditions of choice environments, organizational decision-making structures, and the nature of service experiences. However, the rise of physical AI and embodied intelligent systems introduced a material form of agency in which AI not only processes information but also acts within physical environments, reshaping spatial interactions and service encounters. Therefore, AI should be understood as performative matter that enacts agency through material participation in tourism systems (Belk, 2024), actively shaping the spatial and interactional conditions under which experience unfolds. In other words, AI systems function within a sociotechnical network of humans, platforms, data, and algorithms and constitute the conditions under which tourism experiences are formed.

The interviews revealed that while AI provides visible front-end functions (e.g., recommendations and curation), critical back-end processes (reservation, ticketing, and settlement) remain dependent on human labor and legacy infrastructures. Thus, rather than operating as fully autonomous actors, AI systems are partially enacted, translated, and reconfigured within existing sociotechnical arrangements. These findings highlight the relational and structural dynamics overlooked by conventional models. AI organizes the conditions under which experience becomes possible, co-constituting agency and meaning across human–technology–platform networks. In other words, AI exhibits distributed agency embedded in relational networks while disrupting established human-centered orders (Nath & Manna, 2023). This is consistent with posthumanist perspectives that decenter human agency in favor of relational ontologies.

When AI appears to possess agency, it should not be understood as stemming from inherent intentionality or subjectivity within the technology. Rather, it emerges from a sociotechnical network in which human and non-human elements are inextricably linked. This aligns with the discourse describing AI as disembodied beings—systems that influence social practice and decision-making processes even in the absence of intentionality or phenomenal experience (Köbis et al., 2025). Therefore, the co-construction perspective proposed in this study does not elevate AI to the status of an internal meaning-maker equal to humans. Experience completion and value attribution remain in the human domain. However, the real-time, unfolding structure of that experience is a distributed effect generated within the sociotechnical assemblage of humans, AI, platforms, and data infrastructure. This paradigm extends AI-mediated experience infrastructure into a relational and constitutive process, offering a complementary lens to existing models (Liu-Thompkins et al., 2022; Penner et al., 2026).

Future research should analyze interaction networks among AI, platforms, human employees, and tourists to explore how service outcomes are co-constructed within the entire assemblage. For instance, researchers could investigate whom tourists perceive as the agent responsible for actions during incidents such as booking failures, hallucinated information, or automation errors, or how platform algorithms pre-structure tourists' movement trajectories and destination selections.

Furthermore, as AI-based automation expands, the reconfiguration of participation patterns is a critical research theme. While direct participation and cognitive intervention may decrease in routine tasks, such as itinerary planning, information searching, and on-site decision-making, new forms of participation, such as content creation, real-time experience sharing, AI-based co-curation, and customized experience adjustment, conversely increase. Hence, research should contrast what tourists explore autonomously with what they converge on within choice structures preconfigured by algorithms, analyzing the dynamics of experiential diversity and shifts in agency.

Methodologically, tracing human–AI interaction processes through interviews, participant observation, and digital ethnography is warranted. Integrating these approaches with network analysis and scenario-based experiments would allow the measurement of shifts in agentic attribution, levels of participation, and experiential diversity. Furthermore, there is a pressing need for longitudinal multi-method research that integrates actual service logs, mobility data, and operational data to analyze how AI organizes the relational and material conditions of tourism experiences and the underlying structures of participation. Hence, this study makes the following propositions.

Proposition 11. *The tourism experience should be reconceptualized as a relational, co-constituted phenomenon emerging within human–AI–platform networks.*

Proposition 12. *AI should be theorized as a structural and relational mediator that configures tourism choice environments, service encounters, and organizational decision-making processes.*

Proposition 13. *Agency in tourism should be conceptualized as distributed across tourists, AI systems, platform infrastructures, data ecosystems, and physically embedded service technologies, reflecting a relational ontology in which action emerges from sociotechnical assemblages.*

Proposition 14. *AI failures and malfunctions in tourism (e.g., misaligned recommendations, booking disruptions, or hallucinated information) provide opportunities to examine how agency, responsibility, and accountability are negotiated across human–AI–platform assemblages.*

Proposition 15. *When AI preconfigures tourism action through recommendation systems, itinerary automation, and platform infrastructures, agency should be examined through sociotechnical interaction processes.*

6. Conclusion

This study reframed AI research in tourism as a question of ontological positioning. Existing scholarship largely conceptualized AI as an exogenous tool that enhanced service quality or supported human decision-making. However, the findings showed that AI operated as a sociotechnical mediator that structured choice architectures, information visibility, and interpretive processes. The academic contribution of this study lies in empirically deconstructing the knowledge structure of the vast body of tourism AI literature accumulated over the past five

years, bringing its implicit ontological assumptions to the surface, and reconfiguring them.

6.1. Theoretical implications

First, this study contributes to tourism AI scholarship by empirically identifying technological instrumentalism as a dominant paradigm in the field. This study mapped the intellectual structure of AI research in tourism and hospitality, a field that has seen exponential growth since 2021, through bibliometric coupling analysis and LLM-based information extraction. The results empirically demonstrated that the existing literature remained biased toward technology readiness (Alam et al., 2025; Duan et al., 2025), technology perception (Guan et al., 2025; Tan et al., 2024), and studies on perceived usefulness and ease of use based on the Technology Acceptance Model or the Unified Theory of Acceptance and Use of Technology (Sun, Wong, et al., 2026). The identified knowledge clusters primarily conceptualized AI as an independent or mediating variable for predicting human cognition, attitudes, and behaviors, reflecting a paradigm referred to here as technological instrumentalism. This pattern revealed the epistemological stagnation and path dependency that characterize much of the current tourism AI literature.

Second, this study contributes an ontological reframing of AI agency by integrating three core philosophical perspectives—digital humanism (Hahne & Schmoelz, 2025), transhumanism (Brusseau, 2023), and posthumanism (Cadman et al., 2025). Rather than treating agency as a singular, individual-centric property, this study conceptualizes agency as relational and distributed. This ontological realignment provides a pluralistic foundation for researchers to flexibly select the optimal ontological stance based on the nature and context of their research problems.

Third, this study extends posthumanist scholarship by operationalizing posthumanism as a meta-theoretical framework for tourism AI research. Previous posthumanist tourism research proposed important theoretical shifts by critiquing anthropocentrism and reconstructing human–non-human relationships (Guia & Jamal, 2024)). However, such studies predominantly analyzed tourism practices or the reconstruction of tourism worlds. They rarely examined the knowledge production structures or theoretical premises within the specific academic field of tourism AI research. This study extends these discussions by utilizing posthumanism as a meta-theoretical framework to analyze the ontological assumptions inherent in theory selection, variable composition, and research design in tourism AI studies. Tourism is particularly relevant to this extension because it is a human-centered domain in which emotions, relationships, and experiences are the core value creation processes, while simultaneously being reshaped by AI and platform technologies reconstruct the conditions of these experiences occur. By viewing the tourism experience as a co-constructed process within a human–AI–platform assemblage, this study broadens the scope for examining how algorithms pre-form choice structures and how humans and technologies become multidimensionally entangled.

Fourth, this study clarifies the normative implications of recognizing relational AI agency without displacing human responsibility. The expansion of the ontological horizon does not imply a weakening of human status or an anti-humanist turn. On the contrary, recognizing AI's relational agency and opacity, as distinct from those of traditional technologies (Köbis et al., 2025), makes human accountability and reflexivity in the design and operation of technical systems more explicit. Identifying these characteristics enables humans to proactively identify and address ethical risks concealed within system complexity. Rather than dichotomously separating humanity and technology in a technically mediated environment, this study highlights how human reflexivity and responsibility should be reconstructed within dynamic, co-productive assemblages.

Methodologically, this study further contributes by empirically examining the ontological structure of tourism AI research through a multi-layered approach combining bibliometric analysis, LLM-based theory–variable extraction, and expert interviews. The macro-level knowledge structure identified through bibliometric analysis was consistently reaffirmed by LLM-based network analysis, while industry interviews revealed that academic discourse was partially decoupled from the hybrid and transitional AI reality of the field. Thus, the empirical contribution lies in multidimensionally verifying the ontological premises upon which tourism AI knowledge systems are constructed and empirically exposing the structural gap between academic discourse and industry practice.

6.2. Practical implications

The discrepancy between academic discourse and industrial reality, revealed through expert interviews, provides strategic implications for tourism and hospitality practice. Rather than viewing AI adoption as a uniform technological process, this study proposes distinguishing its practical implications through three complementary perspectives—digital humanism, transhumanism, and posthumanism. Each perspective provides a different practical direction for tourists, platform developers, hotel operators, destination managers, and policymakers in responding to the diffusion of AI.

For a digital humanism perspective, protecting human dignity and agency constitutes a core practical priority. Particularly, online travel agencies and regional tourism platform developers should adopt designs that protect individual agency and dignity. Platforms should refrain from top-down ranking based solely on commercial interests. Instead, they should provide front-end user interface/user experience controls for consumers. Specifically, beyond standard recommendations, platforms should provide sorting options, such as frequently visited by locals, least crowded, and an exploration mode, that break algorithmic bias to offer novel alternatives, thereby ensuring practical choice autonomy. In addition, platform developers should strengthen algorithmic transparency and explainability by providing users and relevant stakeholders with understandable information about the major criteria and data used in recommendation and ranking decisions. These measures can enable users to recognize and actively adjust the algorithmically preformed choice environment rather than passively accepting platform recommendations. Tourists should strengthen algorithmic literacy and exercise data sovereignty to engage in more critical consumption. Tourists should recognize that their digital footprints and interactions can shape and reinforce algorithmic recommendation structures. They should therefore critically evaluate AI-generated tourism information and recommendations, exercise control over how their data is collected and used, and reject algorithmic recommendations or explore alternative options when necessary.

From a transhumanist perspective, using AI to augment rather than substitute human professional capabilities constitutes a core practical priority. Specifically, hotel operators should develop hybrid job structures in which humans and AI share roles. When introducing AI chatbots, unmanned kiosks, or service robots at the frontline, managers should distinguish between repetitive and standardized tasks that can be delegated to AI and emotional, complex, and context-dependent tasks that require human professional judgment. Rather than treating AI as a substitution tool, managers should position it as a collaborative team that elevates and augments the professional capacity of human employees. Consequently, human resource managers must recalibrate training and evaluation systems toward human–technology collaboration competencies, enabling employees to critically review AI-generated information and recommendations while applying their own professional expertise to complex service situations.

From a posthumanist perspective, managing the reconfiguration of responsibility and the potential ambiguity of responsibility arising from distributed agency among human and non-human actors constitutes a core practical priority. AI systems are increasingly involved not only in shaping tourists' choices and destination visibility but also in decision-

making and service operations. In particular, the emergence of agentic AI enables AI systems to move beyond providing recommendations toward making decisions and initiating actions. As a result, it becomes increasingly difficult to attribute a given outcome to a single human actor, as agency and responsibility may be distributed across multiple actors, including AI developers, platforms, tourism organizations, managers, and frontline employees. Accordingly, destination managers and policymakers should move beyond monitoring what outcomes AI produces to clarifying who holds decision-making authority and control in the process through which those outcomes are produced, and where responsibility for those outcomes ultimately resides.

In this respect, the normative-relational agency proposed in this study can be translated into specific governance metrics for monitoring how agency, control, and responsibility are reconfigured and managed within human-AI relationships. First, algorithmic transparency and explainability can be assessed through metrics such as the availability of explanations, disclosure of key decision criteria, and disclosure of the data used in AI-mediated recommendations and decisions. Second, human control and oversight can be assessed through the availability of human review, intervention, and override mechanisms, as well as the extent to which consequential AI-mediated decisions remain subject to human approval. Third, accountability and clarity of responsibility can be assessed by whether responsible actors are explicitly identified whether responsibility is documented across AI developers, platform providers, tourism organizations, managers, and human operators, and whether accountability for AI-mediated outcomes is clearly established. Fourth, fairness and impact diversity can be assessed through indicators such as recommendation diversity, destination exposure, and the distribution or concentration of algorithmic recommendations, which can reveal whether AI-mediated systems systematically favor particular destinations or tourism actors. Importantly, recognizing AI's relational agency does not imply transferring moral or legal responsibility to AI. Rather, these metrics help ensure that human oversight remains meaningful, responsibility remains identifiable, and structural effects emerging from human-AI entanglements can be monitored and addressed.

6.3. Limitations

Despite these contributions, this study has several important limitations. It did not evaluate the technical performance or algorithmic efficiency of AI systems. Instead, it examined how AI was conceptualized within academic discourse through theory–variable coupling structures and modes of knowledge production. Hence, the findings should be interpreted as analytical insights into scholarly representations of AI rather than as assessments of technological effectiveness. The literature dataset was constructed by focusing on core SSCI journals in the tourism and hospitality fields. This approach was suitable for systematically identifying dominant academic discourses and theoretical trajectories within tourism studies. However, it may not sufficiently encompass tourism AI research published in adjacent disciplines, such as information systems, consumer behavior, and marketing, as well as relevant AI and service-related research published in service-oriented journals outside the selected core tourism and hospitality outlets. Therefore, the results should be interpreted primarily within the context of the core academic discourse in tourism and hospitality.

LLM-based extraction provided a systematic and scalable approach for identifying theoretical and empirical patterns. However, it could not fully eliminate the possibility of conceptual omissions or reductions arising from model-based interpretation. While careful validation procedures were employed, implicitly embedded or non-explicit theoretical constructs may not have been fully captured. The industry interviews provided insights into the practical deployment and interpretation of AI. However, the participants were experts in the South Korean tourism and hospitality industry. This geographical and cultural concentration may reflect a specific market context. Given that South Korea's advanced digital infrastructure and rapid technology adoption influence industry perceptions and practices, caution must be exercised when generalizing these findings as universal trends applicable to the global tourism industry. Considering the rapid evolution of AI technologies, this study's findings should be understood as temporally situated. Academic discourse and industry practices are continuously evolving, and future research must examine how emerging forms of AI reshape the ontological conditions of tourism systems.

CRediT authorship contribution statement

Yujeong Jo: Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Hakseung Shin:** Writing – original draft, Supervision, Methodology, Investigation, Conceptualization.

Impact statement

This research reframes artificial intelligence (AI) in tourism and hospitality as a structuring force that shapes decision-making, service interactions, and market dynamics, rather than a simple efficiency-enhancing tool. The framework highlights the need for ethical design, algorithmic transparency, and careful management of emerging issues such as platform dependency, data inequality, and shifting power relations within AI-driven ecosystems. It also clarifies how human–AI collaboration reconfigures labor roles, decision processes, and experience creation in real-world tourism settings. By emphasizing AI as an embedded infrastructure, the study encourages organizations to rethink governance, accountability, and value creation in digitally mediated environments. It further provides guidance for integrating human-centered values—such as fairness, autonomy, and inclusiveness—into AI-driven systems. By reconceptualizing tourism experiences as co-constituted within human–AI–platform systems, the study supports more adaptive, context-sensitive strategies for AI adoption, ultimately strengthening innovation capacity, operational resilience, and the long-term sustainability of tourism ecosystems.

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Declaration of competing interest

None.

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None.

Appendix A

Appendix A. Variables and constructs in AI research within tourism and hospitality

Labeling	Variables in literature	Description	Representative references
Human-likeness & social cues	Anthropomorphism, appearance, voice/accent, social presence, perceived warmth, physical presence, stiff kinesics, perceived animacy, cuteness	Visual, sensory, and nonverbal cues designed to make AI/robots perceived as human-like, focusing on perceived similarity.	Cai, Li, and Law (2022), Jiang et al. (2025), Ku (2024), Parvez et al. (2026), Wang et al. (2023), Ye et al. (2026)
Technology design	Interface design, interaction modality (GUI/ Voice), feedback type, responsiveness, algorithmic explainability, personalization, customization	Structural and functional characteristics of technology pre-designed to optimize user experience and task performance, determined at the developer/system level.	Hu and Lin (2026), Li, Zhang, et al. (2025), Liu et al. (2025a), Park et al. (2026), Yang et al. (2026), Wang et al. (2026c)
Usability & effort	Ease of use, accessibility, effort expectancy, complexity, habit, facilitating conditions, barriers, drivers	Cognitive, temporal, and physical effort perceived by users when interacting with AI, reflecting user-experience evaluation of design outcomes.	Islam et al. (2024), Orden-Mejía and Huertas (2022), Romero-Charneco et al. (2025), Said et al. (2024), Solakis, Katsoni, Mahmoud, and Grigoriou (2024)
Affective reactions	Arousal, pleasure, anger, embarrassment, creepiness, annoyance, perceived enjoyment, emotions, anticipated regret, anticipatory guilt, AI preference	Immediate emotional responses elicited during interaction with AI; short-term, intuitive affective states.	Akhtar et al. (2026), Baek et al. (2025), Chang et al. (2024), Chen et al. (2025), Liu et al. (2023)
Cognitive reactions	Perceived usefulness, benefits, compatibility, utility, perceived values, AI perception, performance expectancy, AI-Guide impact perception, advantages, efficiency	Users' cognitive assessment of the functional and practical value AI provides to tasks, goals, or life.	Ali et al. (2023), Alsaad (2023), Chan et al. (2025), Chi et al. (2022), Kang et al. (2026), Li et al. (2026), Sujood and Pancy (2024)
Motivation & orientation	Intrinsic motivation, extrinsic motivation, goal orientation, learning motivation, hedonic motivation, utilitarian motivation	Internal and external motivational factors and goal-directed psychological states driving AI use and interaction.	Chi et al. (2022), Liu, Zhang, et al. (2024), Lin and He (2024), Manzoor et al. (2024), Sujood and Pancy (2024), Zhang et al. (2024)
Demographic & background	Age, gender, education, income, nationality, employment status	Users' objective sociodemographic characteristics.	Jiang et al. (2025), Khairy et al. (2025), Kim et al. (2022), Li et al. (2026), Said et al. (2024) Wang and Zhang (2025)
Awareness & readiness	AI awareness, AI knowledge, user knowledge or skills, risk awareness, AI readiness, perceived risk, technophilia, innovation characteristics, AI familiarity	Users' pre-existing knowledge, awareness, and readiness regarding AI and related technologies.	Chen and Cai (2025), Kang et al. (2024), Khairy et al. (2025), Lin and He (2024), Sujood and Pancy (2024), Wang et al. (2026a), Xu and Lau (2026), Zhang and Jin (2023)
Psychological capital, traits, & self-concept	Self-efficacy, resilience, self-identity, personality traits (extraversion, narcissism, conscientiousness, skepticism), proactive personality, personal values, tech savviness	Relatively stable personality traits, internal resources, and self-concept influencing technology acceptance and responses.	Khairy et al. (2025), Leong et al. (2025), Li, Li, et al. (2025), Solomovich and Abraham (2026), Xu and Lau (2026)
Relational & attitudinal evaluations	Trust, attachment, sympathy, likability, brand love/hate, schadenfreude toward the organization, perceived empathy, AI empathy, authenticity, sincerity	Evaluations of AI, organizations, or brands formed through repeated interactions, reflecting relational and attitudinal judgments.	Ali et al. (2023), Kim et al. (2022), Solomovich and Abraham (2026), Sujood and Pancy (2024), Wang et al. (2026b), Yang et al. (2026)
Social influence & norms	Subjective norms, social expectations, peer influence, social pressure, social capital, social support, regulatory pressure, leadership, team cohesion	Influence of social expectations, norms, and peer pressure on technology use.	Kang et al. (2024), Liu et al. (2025b), Manzoor et al. (2024), Mistry and Horpynich (2026), Sujood and Pancy (2024), Wang and Zhang (2025)
Human-AI interaction & collaboration	Human–AI/robot collaboration, interactivity, co-production, HRC Events, interaction quality, AI-mediated communication fluency, AI communication inconvenience	Dynamic processes and quality of collaboration when humans and AI jointly perform tasks.	Amin et al. (2025), Chang et al. (2023), Jiang et al. (2025), Kim et al. (2022), Huang, Chen, et al. (2024), Huang et al. (2025), Tosyali et al. (2025), Yu et al. (2026)
Satisfaction & experience appraisal	Satisfaction, job satisfaction, customer experience, brand experience, overall experience, life satisfaction	Overall evaluation of satisfaction and experience resulting from AI interaction and task performance.	Chan et al. (2025), Chang et al. (2023), Ku (2024), Huang, Zhang, et al. (2026), Huang, Jiao, and Zhu (2026), Zhang et al. (2024)
Functional competence perception	Ability, accuracy, technology competence, expected performance, AI/service robot performance, service quality, task–technology fit, AI emotional intelligence, informativeness	Perceived capability of AI to perform tasks accurately, effectively, and appropriately, including emotional or contextual handling.	Ali et al. (2023), Chang et al. (2023), Han et al. (2024), Lu and Currie (2026), Wang and Zhang (2025), Xu et al. (2025)
Reliability & predictability	Reliability, predictability, robotic instability, risk of malfunction, anticipated safety, accountability, credibility	Users' perception of consistent and stable system performance.	Ali et al. (2023), Liu et al. (2025c), Wang et al. (2023), Yan, Luo, and Zhang (2025), Yan, Balasubramanian, et al. (2025),
Control & agency perception	Sense of control, perceived autonomy, agency, opt-out default option	Perceived ability to control and intervene in decision-making and interactions with AI.	Huang, Jiao, and Zhu (2026), Liu, Zhou, et al. (2024), Wang et al. (2024), Yu et al. (2026)
Data, privacy, & surveillance concerns	Information sensitivity, privacy concerns, data control, AI surveillance, algorithmic restraints, disclosure, transparency	Users' perceptions of management and protection of information collection, usage, and monitoring.	Jianu et al. (2025), Huang, Jiao, and Zhu (2026), Song et al. (2024), Wang et al. (2026a), Xie and Lei (2022), Wang et al. (2026b)
Organizational & operational performance	Firm performance, organizational performance, operational efficiency, operational automation, service individualization	Evaluation of AI-enabled organizational and operational capabilities in performing tasks.	Demir and Demir (2024), Hu and Lin (2026), Tajeddini et al. (2026)
Uncertainty & psychological unease	Uncertainty, technology insecurity, technology anxiety, perceived threat, perceived fear	Users' perception of uncertainty and emotional unease during technology interactions.	Alsaad (2023), Jung et al. (2023), Li, Zhang, et al. (2025), Lu and Currie (2026), Wang et al. (2026a), Yu et al. (2026)
Moral & fairness evaluation	Organizational dehumanization, depersonalization, perceived discrimination, illegitimate tasks, mistreatment, ethics, moral obligation, moral disgust, moral identification, moral incongruence	Assessment of dignity, fairness, and legitimacy in interactions with AI.	Fan et al. (2025), Jia et al. (2025), Jung et al. (2023), Khan & Soomro, 2025;Liu et al. (2025c)

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Labeling	Variables in literature	Description	Representative references
Role-related threat & strain	AI replacement, job insecurity, role ambiguity, job anxiety, stress, ego depletion, emotional exhaustion, job burnout, fatigue, negative work-related rumination	Psychological strain and role threat caused by technology adoption.	Chen and Cai (2025), Jia et al. (2025), Kang et al. (2024), Liu, Li, et al. (2024), Wang et al. (2026a), Xu and Lau (2026), Zhang and Jin (2023), Zhang, Wang, et al. (2025)
Contextual factors	Service context, service failure, time pressure, social distance, COVID-19, competitive pressure, AI contactless services, ambient light luminance	Exogenous physical, temporal, social, or event-related conditions affecting interactions.	Chan et al. (2025), Liu, Wang, and Qin (2024), Li, Zhang, et al. (2025), Manzoor et al. (2024), Song et al. (2025)
Engagement & participation	Engagement, involvement, coproduction involvement, psychological ownership	Users' perceived active participation in the interaction process.	Fang et al. (2025), Liu et al. (2025b, 2025c), Ruiz-Equihua et al. (2023), Wu et al. (2023)
Engagement & performance (work)	Job crafting, unlearning, service innovation behavior, creativity, AI crafting, AI-driven algorithmic management, AIGC techno-overload, AI event strength, job engagement	Proactive task changes and innovative performance at employee or organizational level.	Fan et al. (2025), Khairy et al. (2025), Li, Li, et al. (2025), Li et al. (2024), Liu and Cheng (2025), Lu and Currie (2026), Zhang, Li, and Lin (2025)
Behavioral intentions (core)	Adoption intention, use intention, revisit intention, purchase intention, behavior intention, willingness to pay, loyalty	Core behavioral intentions regarding AI or service usage.	Ali et al. (2023), Alsaad (2023), Chi et al. (2022), Kang et al. (2026), Li, Zhang, et al. (2025), Li et al. (2026), Park et al. (2026), Yang et al. (2026)
Behavioral responses (technology avoidance)	Avoidance, resistance, aversion, employees' aversion to AI systems, AI boycott	User responses characterized by deliberate avoidance, resistance, or non-use of AI or technology systems due to perceived risks, lack of trust, discomfort, or misalignment with needs.	Jianu et al. (2025), Liu and Cheng (2025), Manzoor et al. (2024), Morosan (2025), Wang et al. (2023), Yang et al. (2025)
Customer citizenship & co-creation	Value co-creation, citizenship behavior, pro-environmental behavior	Voluntary engagement in relational behaviors and collaborative value creation.	Demir and Demir (2024), Majid et al. (2026), Sun, Ma, and Li (2026)
In-role/extra-role behaviors	Service performance, organizational citizenship behavior, proactive service behavior, customer helping behavior,	Voluntary behaviors that extend beyond formal role requirements, contributing to work and relational outcomes.	Jiang et al. (2025), Leong et al. (2025), Liu, Li, et al. (2024), Wang and Zhang (2025), Wang et al. (2026a), Xu and Lau (2026),
Work withdrawal/ turnover intention	Turnover intention, retention intention, service sabotage, work withdrawal behavior	Intentions or actions that reflect withdrawal or disengagement from a job or organization.	Chen and Cai (2025), Jianu et al. (2025), Liu, Wang, and Qin (2024), Mistry and Horpynich (2026), Yu et al. (2026), Zhang, Wang, et al. (2025)

Appendix B. Theoretical frameworks in AI research in tourism and hospitality

Category	Theories
Technology acceptance & innovation	Technology acceptance model, unified theory of acceptance and use of technology, value-based adoption model, innovation diffusion theory, artificially intelligent device use acceptance framework, push-pull mooring model, disruptive innovation theory, perceived characteristics of innovation, AI job replacement theory, artificially intelligent device use acceptance framework, affordance-actualization theory, technology affordance theory, digital competence theory, technological singularity theory, extended reality, framework, theory of data network effect, theory of consumption values
Cognitive & information processing	Elaboration likelihood model, dual process theory, heuristic-systematic model, schema theory, construal level theory, cue utilization theory, expectancy disconfirmation theory, stimulus-organism-response, cognitive-affective-conative, pleasure-arousal-dominance, motivated reasoning theory, predictive processing theory, model of Ad credibility, information processing theory, self-serving bias, attribution theory, regulatory fucus theory, cognitive emotion theory, sense-think-act framework, expectancy theory, consistency theory, persuasion knowledge model
Psychological resources, stress, & coping	Conservation of resources theory, transactional theory of stress, coping theory, challenge-hindrance framework, psychological capital theory, behavioral immune system, self-determination theory, psychological ownership theory, self-identity theory, self-perception theory, broaden-and-build theory, groundedness theory, psychological reactance theory, proactive motivation model
Social psychology & communication	Theory of planned behavior, social exchange theory, social identity theory, social impact theory, communication theory, media richness theory, inoculation theory. Guanxi model, face concept, Li code, norm activation model, value-belief-norm theory, interpersonal justice theory, social cognition theory, social amplification of risk framework
Human–computer interaction, social presence, & relationship	Computers are social actors paradigm, uncanny valley theory, social presence theory, anthropomorphism theory, media equation theory, mind perception theory, virtual companion theory, social response theory, stereotype content model, gender stereotype theory, assemblage theory, x reality framework, social facilitation theory,
Organizational, strategic, & system	Resource-based view, knowledge-based view, dynamic capabilities framework, contingency theory, sociotechnical system theory, technology-organization-environment framework, human-organization-technology-environment model, upper echelons theory, job demands-resources model, work adjustment theory, career theory, service profit chain theory
Specialized & behavioral economics	Privacy calculus theory, protection motivation theory, prospect theory, cumulative prospect theory, benign violation theory, ethics position theory, theory of moral responsibility, experience economy, service-dominant logic, customer inspiration theory, means-end chain theory, cumulative specialized & behavioral economics, event system theory, behaviors from intergroup affect and stereotypes map framework

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