

## **Systematic Literature Review (SLR): Technology Implementation and Digitalization in Tourism and Hotel Services**

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### **Abstract**

The rapid adoption of digital technologies has fundamentally reshaped service delivery across the global tourism and hospitality sector. While an expanding body of literature addresses individual aspects of this transformation, the field still lacks a comprehensive synthesis that simultaneously maps dominant technology categories, examines prevailing methodological orientations, and critically analyzes implementation challenges across diverse tourism contexts, particularly in developing economies. This study addressed that gap through a Systematic Literature Review (SLR) of 63 peer-reviewed documents retrieved from the Scopus database (2015–2025). Documents were screened using the PRISMA protocol with explicit inclusion and exclusion criteria covering publication period, language, document type, thematic relevance, and methodological quality. Bibliometric analysis was conducted using VOSviewer (version 1.6.20) and the RStudio Bibliometrix package. Three research questions guided the synthesis: (RQ1) which technology categories dominate the literature; (RQ2) what methodological approaches characterize this field; and (RQ3) what challenges and best-practice solutions are associated with technology adoption. The findings reveal four dominant themes: (1) artificial intelligence, IoT, and smart technologies as drivers of operational efficiency and personalized service; (2) mobile applications and online platforms reshaping booking behavior within a Technology Acceptance Model (TAM) framework; (3) persistent barriers, including digital literacy gaps, data privacy concerns, and employee resistance, which are especially pronounced in SME-dominated and developing-country contexts; and (4) COVID-19 as a structural accelerant of contactless and automated service delivery. The study's novelty lies in its cross-cutting synthesis, integrating technology classification, methodological critique, and challenge analysis while foregrounding the underexplored context of developing tourism economies. Theoretically, this review advances digital tourism literature by identifying boundary conditions of TAM and proposing an integrated analytical framework for future research. Practically, the findings provide actionable guidance for tourism managers, destination management organizations, and policymakers navigating digital transformation.

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## **INTRODUCTION**

The tourism and hospitality industry is one of the largest and fastest-growing sectors of the global economy. According to the United Nations World Tourism Organization (UNWTO, 2023), international tourist arrivals reached approximately 1.3 billion in 2023, reflecting a

strong recovery from the disruption caused by the COVID-19 pandemic. Importantly, this recovery has not represented a return to pre-pandemic norms; instead, it has been accompanied by a fundamental shift in how tourism services are delivered, consumed, and managed. At the core of this structural shift is the widespread adoption of digital technologies, including mobile applications, artificial intelligence (AI), the Internet of Things (IoT), big data analytics, and cloud computing (Vermesan & Bacquet, 2022).

The accelerating pace of digitalization has reshaped virtually every stage of the tourist journey, from pre-trip planning and booking to in-destination experience and post-trip engagement (Buhalis & Leung, 2018; Gretzel et al., 2015). From the supply side, digital transformation has created opportunities to enhance operational efficiency, personalize service offerings, and leverage real-time data for decision-making. From the demand side, tourists now expect seamless, technology-enabled experiences, increasing competitive pressure on service providers that fail to keep pace (Pencarelli, 2020). These converging pressures have made digital competence a strategic imperative rather than a peripheral concern.

In Indonesia, the government has recognized the strategic importance of tourism digitalization through initiatives such as the “10 New Bali” program and the Digital Tourism Destination development agenda. These programs aim to leverage digital infrastructure to attract international visitors, improve destination management, and empower local tourism enterprises. Nevertheless, many establishments, particularly micro and small enterprises, continue to face significant barriers to digital adoption, including limited technical capacity, inadequate infrastructure, and low digital literacy among staff (Ozdemir et al., 2023). Indonesia’s experience reflects a broader pattern in developing economies, where the benefits of digital transformation are unevenly distributed across the industry.

Existing research has examined specific technology applications in depth, including AI-powered chatbots (Wang et al., 2025), service robots (Ivanov & Webster, 2019), smart hotel systems (Kim & Han, 2020), and social media in tourist behavior (Xiang & Gretzel, 2010). These studies have generated valuable insights; however, their scope remains inherently partial. What is still lacking in the literature is a comprehensive synthesis that integrates multiple technology categories, research methodologies, and geographic contexts within a single, methodologically rigorous review.

Three specific gaps motivate this study. First, prior reviews have typically focused on a single technology category (e.g., AI, IoT, or AR/VR) or a single theoretical lens (predominantly TAM), producing rich but narrow insights. No recent SLR has simultaneously integrated the full spectrum of dominant technologies with a cross-cutting analysis of shared implementation challenges. Second, existing reviews rarely address methodological patterns in the field, leaving unexplored the extent to which the dominance of quantitative, TAM-based approaches may limit theoretical diversity and practical applicability. Third, the challenges of digital adoption in developing-country tourism contexts—where infrastructure deficits, SME fragmentation, and low digital readiness are especially pronounced—remain systematically underrepresented in synthesis-level scholarship.

This study addressed these gaps through a Systematic Literature Review (SLR) of peer-reviewed literature published between 2015 and 2025, retrieved from the Scopus database. The novelty of this study is threefold: (1) it provides the first cross-category, cross-methodological synthesis of technology implementation and digitalization research in tourism and hospitality

over the 2015–2025 period; (2) it advances a critical appraisal of TAM’s explanatory boundaries in the era of generative AI and immersive technologies; and (3) it explicitly positions findings within the context of developing economies, offering a more globally inclusive analytical perspective than prior reviews. The findings are intended to serve both as a structured knowledge map for researchers and as an evidence base for practitioners and policymakers designing or evaluating digital transformation strategies in tourism.

## **METHOD**

This study employed a Systematic Literature Review (SLR) methodology to identify, screen, evaluate, and synthesize evidence from existing research (Latifah & Ritonga, 2020). The review followed a structured and predefined protocol to ensure transparency and reduce selection bias. The process was guided by the PRISMA framework (Preferred Reporting Items for Systematic Reviews and Meta-Analyses), which is widely used as a reporting standard for systematic reviews in the social and management sciences.

### **Database Selection and Search Strategy**

Data collection was conducted using the Scopus database, selected for three reasons: (1) it is the largest abstract and citation database of peer-reviewed literature in the social sciences, providing broad coverage of hospitality and tourism journals (Gutierriz et al., 2025); (2) it supports advanced Boolean search across title, abstract, and keywords fields, enabling a reproducible and precisely bounded search; and (3) its subject classification system allows for systematic filtering by document type, language, and discipline. While multi-database searches (e.g., combining Scopus with Web of Science or EBSCO) can maximise recall, the Scopus-only approach was justified in this study by its comprehensive coverage of the target journals and the aim of producing a focused, high-precision corpus rather than an exhaustive one.

The following search string was applied to the title, abstract, and keywords (TITLE-ABS-KEY) fields: TITLE-ABS-KEY ("technology" AND "digitalization" AND ("tourism" OR "hospitality")) Data collection was completed on 15 June 2025. The search covered publications from 2015 to 2025, a decade-long window selected to capture the critical acceleration of digital transformation in tourism, including the pre-pandemic consolidation phase (2015–2019), the pandemic-induced disruption (2020–2021), and the post-pandemic recovery and innovation phase (2022–2025). Documents published prior to 2015 were excluded because the contemporary digital tourism ecosystem characterised by smartphones, IoT, AI, and platform-based OTAs had not yet reached sufficient critical mass to constitute a coherent research domain.

## **RESULTS AND DISCUSSION**

### **Forms of Technology and Digitalization in Tourism and Hospitality**

The 63 reviewed documents collectively map a rapidly diversifying technological landscape across the tourism and hospitality sector. As summarised in Table 3, five dominant technology categories emerge from the synthesis: AI and machine learning (including chatbots and service robots), IoT-based smart hotel systems, mobile applications and online booking platforms, big data and data analytics, and immersive technologies (AR/VR). These categories are not mutually exclusive; a significant portion of studies examined how two or more

technologies converge within a single service context, suggesting that the field is moving from single-technology adoption studies toward integrated digital ecosystem research.

**Table 3. Technology and digitalization themes in tourism and hospitality research (n = 63)**

Technology Category / Sub-Theme	Number of Studies
<b>AI, Machine Learning, and Chatbots</b>	
AI-powered chatbots and virtual assistants	7
Machine learning for demand forecasting and personalization	5
Robotic process automation and service robots	4
<b>IoT and Smart Hotel Technologies</b>	
Smart room systems and connected devices	6
IoT-based operational management	5
<b>Mobile Applications and Online Booking Platforms</b>	
Mobile app adoption (TAM-based studies)	8
e-Service quality and online purchasing intention	4
<b>Big Data and Data Analytics</b>	
Big data in tourism demand analysis	5
Predictive analytics for revenue management	4
<b>Augmented Reality (AR) and Virtual Reality (VR)</b>	
AR/VR in destination marketing and visitor experience	5
<b>Digital Transformation Strategy and Challenges</b>	
Barriers to digital adoption (SMEs and developing regions)	5
Digital literacy and workforce readiness	5

**Artificial Intelligence, Machine Learning, and Service Robots**

Artificial intelligence constitutes the most extensively researched category (16 studies), encompassing chatbots and virtual assistants, machine learning for demand forecasting, and robotic service delivery. AI-powered chatbots and virtual assistants have become standard front-line service tools in hotels and travel agencies, enabling 24/7 customer engagement and significant labour cost reduction (Mariani & Law, 2025; Wang et al., 2025). Machine learning models integrating booking history, social media sentiment, and exogenous demand shocks consistently outperform traditional time-series forecasting approaches in hotel revenue management contexts (Henriques & Pereira, 2024; Lv et al., 2022).

Service robots represent a qualitatively distinct dimension of AI adoption, as they introduce human-machine interaction dynamics that purely software-based AI does not. The foundational framework proposed by Ivanov & Webster (2019) identified perceived usefulness

and social presence as the primary determinants of robot acceptance, findings subsequently validated across hotel lobby, restaurant, and room-service deployments. However, a consistent moderating pattern has emerged: acceptance rates are significantly higher among younger, digitally literate guests, while older and less technology-proficient guests report discomfort and frustration (Gursoy et al., 2022). This differential acceptance has particular relevance for destinations serving diverse demographic segments, including heritage and cultural tourism sites prevalent in developing economies.

### **IoT and Smart Hotel Technologies**

IoT-based systems, examined in 11 studies, enable the 'smart hotel' concept through the integration of sensor networks, connected devices, and real-time data exchange across operational and guest-facing systems. Key demonstrated outcomes include enhanced guest satisfaction through AI-assisted room control and digital check-in, improved energy management, and predictive maintenance capabilities that reduce service disruptions (Dianawati et al., 2024; Nadkarni et al., 2020). A bibliometric analysis by Chang et al. (2024) identified 'sustainable hotel' and 'consumer decision-making' as the two dominant intellectual clusters in smart hotel research, underscoring IoT's dual role in guest experience optimisation and environmental sustainability a convergence with growing strategic relevance given increasing ESG expectations from investors and travellers alike.

A critical pattern across IoT studies is the capital intensity barrier: while large hotel chains can achieve economies of scale in IoT deployment, smaller independent properties and tourism enterprises in developing countries face prohibitive setup costs, integration complexity, and in-house technical skill shortages (Alsharif et al., 2024). This bifurcation reinforces a structural inequality in which digital sophistication increasingly demarcates competitive tiers within the global hospitality market.

### **Mobile Applications and Online Booking Platforms**

Mobile applications and online booking platforms, examined in 12 studies, represent the most direct interface between digital technology and the tourist. TAM-based meta-analysis across 119 studies confirms that perceived usefulness and perceived ease of use are the most robust cross-contextual predictors of technology adoption intention (Li et al., 2024). Beyond these core constructs, system quality and offline brand trust have been shown to significantly moderate adoption via usability perceptions (Albayrak et al., 2023), suggesting that digital and physical brand management are increasingly interdependent.

Online Travel Agencies (OTAs) have disrupted traditional distribution channels by empowering tourists to compare, review, and book services independently. A notable finding from Tiamiyu et al. (2023) challenges prevailing assumptions: platform interactivity and information stickiness exerted greater influence on purchase intention than technology readiness per se, implying that user experience design is at least as important as supply-side digital infrastructure in driving adoption. This finding is especially pertinent for developing-country tourism platforms, where investing in UX quality may yield higher returns than broad infrastructure upgrades. Research by Susanto et al. (2022) conducted in Indonesian tourism destinations reinforces this conclusion: trust in digital payment security emerged as the dominant factor in adoption, pointing to the criticality of perceived safety over functional features in low-trust digital environments.

## Big Data and Data Analytics

Big data analytics (9 studies) has become a foundational capability for evidence-based tourism management. Studies document its application in granular visitor behaviour analysis, demand forecasting, and revenue optimisation through the aggregation of social media, booking engine, mobile device, and point-of-sale data streams (Lv et al., 2022; Mariani & Baggio, 2022). When combined with machine learning, big data-driven personalisation has been shown to improve both tourist engagement metrics and repeat visit intention (Xu et al., 2023). However, consistent barriers data governance deficits, privacy compliance challenges, and the absence of unified data standards undermine the effectiveness of analytics-driven decision-making, particularly in Southeast Asian destinations where source fragmentation is acute (Alsharif et al., 2024). These findings point to the need for destination management organisations (DMOs) to assume a coordinating role in establishing shared data infrastructure.

## Augmented Reality and Virtual Reality

AR and VR technologies (5 studies) have established a distinctive role in the experience economy by enabling pre-trip destination previewing, immersive heritage interpretation, and uncertainty reduction in accommodation booking. A meta-analysis of 64 studies confirmed that immersive technologies significantly enhance tourist engagement, perceived value, and revisit intention, with VR producing stronger effects than AR due to its higher degree of sensory immersion (Fan et al., 2022). The emerging metaverse concept has attracted early scholarly attention, with bibliometric evidence indicating exponential growth in research since 2021 (Huang et al., 2024). However, mainstream adoption among tourism enterprises remains constrained by content development costs and hardware accessibility barriers obstacles that are especially significant for SMEs and heritage tourism operators in developing countries, where capital constraints and low digital infrastructure limit experiential technology deployment.

## Research Methods in Tourism Technology Studies

Analysis of research methodologies across the 63 reviewed documents reveals a pronounced dominance of quantitative approaches. As summarised in Table 4, 34 studies (54.0%) employed survey-based designs with SEM or PLS-SEM as the primary analytical technique, reflecting the strong influence of TAM and its extensions in framing consumer-facing technology research. Qualitative studies (19.0%) predominantly drew on semi-structured interviews with hotel managers, frontline staff, or tourism operators to examine organisational perspectives on digital transformation barriers and change management. Mixed-method designs (14.3%), though less common, offered enhanced explanatory power by integrating the breadth of survey data with the contextual depth of qualitative insight. Bibliometric and systematic reviews (12.7%) served an important synthesising function, mapping intellectual domains and identifying research trajectories.

**Table 4. Research methodologies across the reviewed corpus (n = 63)**

No.	Research Approach	n	%
1	Quantitative (survey/questionnaire; SEM, PLS-SEM)	34	54.0%
2	Qualitative (interviews, case study, content analysis)	12	19.0%
3	Mixed methods (quantitative + qualitative)	9	14.3%
4	Bibliometric or systematic review	8	12.7%

This methodological pattern carries an important implication: the predominance of cross-sectional, survey-based TAM studies limits the field's capacity to capture dynamic, longitudinal, and organisational dimensions of digital transformation. The near-absence of ethnographic, participatory, or action-research approaches is particularly notable, given that tourism digitalization unfolds through complex social processes involving multiple stakeholders with divergent interests and digital competencies. The review thus identifies methodological diversification particularly longitudinal designs and multi-stakeholder qualitative approaches as a priority for the next phase of research in this domain.

### **Challenges and Best-Practice Solutions**

Three dominant challenge clusters emerge from the synthesis: digital readiness gaps, data security and privacy concerns, and the risk of service depersonalisation. These challenges are structurally interconnected and are particularly acute in SME-dominated and developing-country tourism contexts.

#### **Digital Readiness Gaps**

Digital readiness gaps refer to the uneven distribution of technological capacity across the industry. While large hotel chains and well-funded OTAs have been early adopters of AI, IoT, and big data systems, independent properties and tourism SMEs in developing countries lag significantly (Ozdemir et al., 2023). This bifurcation creates a structural inequality in which digital sophistication becomes a competitive threshold, progressively marginalising smaller operators from high-value market segments. Compounding this structural issue, frontline employees frequently report insufficient digital training and low self-efficacy when operating increasingly complex systems a human capital deficit that technical investment alone cannot resolve.

#### **Data Security and Privacy Concerns**

Data security and privacy concerns grow proportionally with the volume of personal data collected by smart tourism platforms, booking applications, and loyalty programs. Despite evident operational benefits, tourists remain apprehensive about data governance, particularly in contexts where regulatory frameworks are weak or unevenly enforced (Elkhwesky & Elkhwesky, 2022). Properties that communicate transparently about data use and offer explicit opt-in mechanisms for personalised services achieve significantly higher levels of guest trust and technology acceptance. The EU General Data Protection Regulation (GDPR) has established important normative precedents, but equivalent frameworks are absent or nascent across much of Southeast Asia, Latin America, and sub-Saharan Africa regions characterised by rapidly growing but institutionally fragile digital tourism ecosystems.

#### **Service Depersonalisation**

The risk of service depersonalisation is a subtler but equally significant challenge. As AI and automation assume increasing shares of the guest interaction cycle, concerns arise among both researchers and practitioners that the warmth, empathy, and contextual judgment that distinguish high-quality hospitality service may be systematically eroded. Guest perception studies consistently find that while efficiency and convenience are valued, guests remain sensitive to the authenticity and attentiveness of service encounters (Gursoy et al., 2022; Wang et al., 2025). The most effective implementations documented in the literature adopt a hybrid model in which technology manages routine and transactional interactions while human

staff are redeployed to high-value, relationship-intensive service moments a model that requires deliberate service blueprint redesign rather than incremental automation.

### **Best-Practice Solutions**

Best-practice solutions emerging from the literature converge on three strategic imperatives. First, phased digital transformation roadmaps beginning with high-ROI, high-acceptance technologies (mobile check-in, AI chatbots) before progressing to complex system integration reduce operational disruption and build internal digital confidence incrementally. Second, sustained investment in human capital development, through digital skills training tailored to specific operational contexts and aligned with the guest digital journey, is consistently identified as a critical success factor. Third, collaborative digital governance frameworks at the destination level coordinated by DMOs to provide shared booking platforms, unified data portals, and training resources have proven effective in enabling SMEs to access digital capabilities that would otherwise be unaffordable to develop independently. This third strategy is of particular relevance for developing-country destinations such as Indonesia, where the SME-dominated tourism structure necessitates collective rather than firm-level digital strategies.

### **Theoretical Implications: Reassessing TAM in the Digital Tourism Era**

The most significant theoretical contribution of this review concerns the status of TAM as the field's dominant explanatory framework. The meta-analytic evidence from Li et al. (2024) confirms TAM's robust cross-contextual predictive validity, yet several studies in the reviewed corpus provide compelling evidence that the model's explanatory boundaries are being tested by newer technology modalities. Mogaji et al. (2024) argue that in the era of generative AI, TAM's dyadic utility-ease constructs are inadequate to capture co-creation dynamics, emotional bonding with AI agents, and the increasingly blurred boundaries between human and machine service provision. The reviewed literature on VR, AR, and service robots corroborates this critique: acceptance of immersive and social technologies is shaped as much by perceived authenticity, sensory presence, and trust in the AI agent as by perceived usefulness (Fan et al., 2022; Gursoy et al., 2022).

This review contributes to the digital tourism literature by positioning this TAM critique within a broader disciplinary argument: the field's overwhelming reliance on cross-sectional, quantitative, TAM-based methods (54.0% of the corpus) is producing theoretically homogeneous findings that may underestimate the complexity of technology adoption in high-contact, emotionally charged service environments. A theoretical reorientation is needed one that integrates affective computing frameworks, service-dominant logic, and social presence theory alongside TAM, and that is tested through methodologically diverse study designs. This is the primary theoretical frontier identified by this review.

The COVID-19 pandemic's role as a structural accelerant of digital transformation warrants particular interpretive attention. Multiple studies document a compression of what might otherwise have been a decade-long transformation into a matter of months, with contactless services, remote management tools, and AI-assisted health screening deployed under acute operational pressure (Bonfanti et al., 2021; Jiang & Wen, 2020). While the pandemic thus catalysed adoption, it also produced fragmented, reactively assembled digital ecosystems, particularly among independent operators. The distinction between pandemic-

accelerated tactical digitalization and strategically planned digital transformation remains an underexplored theoretical problem with significant practical implications.

### **Practical Implications: Digital Strategy for Tourism Enterprises and DMOs**

From a practitioner perspective, the review yields several actionable conclusions. The evidence overwhelmingly supports hybrid human-AI service models over full automation in hospitality contexts. Across technology categories, the most consistently positive guest outcomes are associated with implementations that preserve meaningful human touchpoints while delegating routine, transactional, and data-intensive tasks to digital systems. This principle should guide service blueprint design and technology investment prioritisation, particularly in segments such as luxury hospitality, heritage tourism, and culturally embedded local tourism where relational service quality is a core value proposition.

For destination management organisations, the review highlights the strategic leverage available through collective digital governance. The evidence from developing-country tourism contexts, including Indonesia, demonstrates that individual SME-level digital investment is rarely sufficient to produce competitive outcomes, but that coordinated destination-level digital infrastructure shared booking platforms, unified tourism data portals, and collectively funded digital training programs can extend digital capabilities to a far broader operator base. This finding has direct policy relevance for tourism ministries and regional tourism authorities seeking to design cost-effective digitalization support programmes.

The data privacy challenge identified across the corpus should not be framed solely as a compliance burden. Research consistently shows that transparent data governance and explicit consent mechanisms are positively associated with technology acceptance and brand trust suggesting that privacy-by-design approaches represent a competitive advantage rather than merely a regulatory obligation. Tourism businesses in markets transitioning toward digital maturity, including Indonesia and broader Southeast Asia, have an opportunity to build consumer trust proactively rather than reactively.

### **Contextual Positioning: Developing Economies and the Global Knowledge Gap**

A consistent and notable feature of the reviewed corpus is its geographic concentration: the majority of empirical studies originate from China, the United States, Europe, and South Korea. Southeast Asia, sub-Saharan Africa, and Latin America are substantially underrepresented a gap that is not merely a bibliometric artifact but reflects genuine disparities in research capacity, funding, and institutional support for tourism scholarship in emerging economies.

This geographic imbalance has substantive implications for the field's external validity. The digital adoption barriers most extensively documented in the literature capital constraints, low digital literacy, fragmented SME structures, weak data governance frameworks are disproportionately severe in underrepresented regions, yet the solutions proposed in the literature are largely derived from evidence generated in high-resource, high-infrastructure contexts. Indonesia, with its SME-dominated tourism structure, archipelagic geography, and heterogeneous digital infrastructure, represents a prototypical case of the developing-economy tourism context where existing findings may not transfer straightforwardly. Analytically, the challenge typologies identified in this review (digital readiness gaps, data insecurity, depersonalisation risk) are likely more severe in magnitude in such contexts, even if structurally similar. Contextually adapted research rigorous empirical studies designed from

within developing-economy tourism settings rather than applied retrospectively is urgently needed.

## CONCLUSION

This Systematic Literature Review synthesized 63 peer-reviewed documents to map the state of technology implementation and digitalization research in tourism and hospitality from 2015 to 2025. The review identified five dominant technology categories: artificial intelligence (AI) and machine learning, IoT-based smart hotel systems, mobile applications and online booking platforms, big data analytics, and immersive AR/VR technologies. These technologies collectively demonstrated measurable contributions to operational efficiency, service personalization, and guest experience quality. However, the literature also documented three persistent implementation challenges: digital readiness gaps, data security concerns, and risks of service depersonalization, which are particularly pronounced in developing economies and SME-dominated tourism contexts. Methodologically, the field remained dominated by cross-sectional, TAM-based quantitative designs, which accounted for more than half of the reviewed studies.

This review contributed to the digital tourism literature in three key ways. First, it provided a decade-spanning, cross-category synthesis (2015–2025) that simultaneously mapped technology diversity, methodological patterns, and challenge typologies, offering a more integrated knowledge structure than prior reviews focused on single technologies or frameworks. Second, it developed a critical assessment of TAM's explanatory capacity in the current technological landscape, arguing that its core constructs are limited in capturing the affective, relational, and co-creative dimensions of AI-, VR-, and robotics-enabled service interactions. Third, it foregrounded the developing-economy context as a central analytical dimension by showing how existing theoretical frameworks may require boundary condition adjustments when applied in low-resource, fragmented SME-based tourism ecosystems.

From a practical perspective, the most significant implication for tourism managers is the consistent evidence supporting hybrid human–AI service models over full automation. This principle should guide technology investment decisions and service blueprint redesign across hospitality segments. For destination management organizations and policymakers, the findings support the development of collective digital governance frameworks as a cost-effective mechanism for expanding digital capabilities within SME-dominated tourism ecosystems. For tourism educators, the review highlights the importance of integrating both technical digital competencies and strategic ethical digital leadership skills into hospitality and tourism curricula, enabling future professionals to lead rather than merely execute digital transformation initiatives.

Based on the gaps identified in this review, several future research directions are proposed. First, longitudinal studies are needed to distinguish long-term, strategically driven digital transformation from pandemic-induced tactical adoption, as well as to assess its sustained effects on service quality, employee well-being, and competitiveness. Second, more methodologically diverse research designs, including ethnographic, participatory, and action research approaches, should complement the dominant SEM-based paradigm to better capture the social and organizational dynamics of technology adoption in high-contact service environments. Third, context-specific empirical studies in developing economies should be

designed within those contexts rather than retrospectively generalized to them, particularly in Southeast Asia, Africa, and Latin America, to produce more contextually valid theoretical and practical insights. Fourth, interdisciplinary research integrating sustainability science, behavioral economics, and human–computer interaction perspectives is needed to enrich the theoretical repertoire of the field and strengthen the link between digital transformation and broader sustainable development objectives.

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