
Kolehposhti: A Design-Science Framework for Explainable, Inclusive, and Culturally Responsible AI-Powered Smart Tourism

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Abstract.

AI-powered travel services increasingly mediate destination discovery, itinerary formation, cultural interpretation, and interactions with local providers. Yet many platforms optimise individual transactions while leaving recommendations opaque, heritage representations epistemically ambiguous, accessibility uneven, and local participation vulnerable to ranking inequalities. This study develops Kolehposhti as a conceptual socio-technical architecture for responsible smart tourism. Using a design-science orientation, it combines an integrative, design-oriented synthesis of 44 scholarly and authoritative sources with a structured analysis of the project brief. The analysis applies domain coding, requirement derivation, and requirements-to-module traceability; the project brief is treated as a design input rather than empirical evidence. Six interdependent requirement domains emerge: context-sensitive decision support, explainable human-AI interaction, evidence-labelled immersive heritage, multilingual and accessible mediation, equitable local-provider participation, and embedded governance. These requirements are integrated into six modules: a traveller-profile and consent layer, an itinerary and recommendation engine, a multilingual interface, an immersive heritage layer, a verified local-provider ecosystem, and a governance and accountability layer. The framework extends smart-tourism research by operationalising explainability, cultural provenance, contestability, and exposure fairness as architectural requirements rather than optional features. It does not claim demonstrated usability or impact. Instead, it provides a traceable design proposition and a testable evaluation agenda for future prototype studies with travellers, disabled users, local providers, guides, heritage specialists, and destination stakeholders.

Keywords: smart tourism; responsible artificial intelligence; explainable recommendation; cultural heritage; local participation

1. 1. Introduction

Artificial intelligence (AI), immersive media, and real-time data are shifting tourism platforms from information repositories toward active decision mediators. Travellers increasingly use digital systems to select destinations, assemble itineraries, interpret places, and evaluate providers. Smart tourism therefore cannot be reduced to the presence of an application or a recommendation algorithm. It is a socio-technical ecosystem in which data, physical infrastructure, platforms, visitors, residents, providers, and destination-management organisations interact (Gretzel et al., 2015; Boes et al., 2016; Koo et al., 2016; Ivars-Baidal et al., 2019). Recent work describes a transition toward AI-powered smart tourism 2.0, in which AI-human integration, virtual layers, and new governance demands become central rather than peripheral (Koo et al., 2025).

The practical user problem remains fragmentation. Information about attractions, transportation, accommodation, food, weather, accessibility, opening hours, language, safety, and cultural context is distributed across unrelated services. Recommendation systems can reduce search costs, but popularity-based or similarity-based ranking is insufficient when a trip depends on interacting constraints such as budget, time, mobility, dietary needs, seasonality, distance, crowding, and changing local conditions (Borràs et al., 2014; Hamid et al., 2021). Generative AI may make planning conversational, yet adoption research also shows that travellers' resistance is shaped by perceived risk, complexity, and individual differences; a fluent interface is not equivalent to a trustworthy decision aid (Seyfi et al., 2025).

For cultural and heritage destinations, the challenge is also epistemic. Virtual reality (VR), augmented reality (AR), 360-degree media, and digital reconstruction can strengthen presence, learning, and intention to visit (Chung et al., 2015; Tussyadiah et al., 2018; Fan et al., 2022). However, visual realism can produce false certainty when users cannot distinguish documented evidence from scholarly reconstruction or creative interpretation. The London Charter (2009) and heritage scholarship require intellectual transparency, provenance, and clear differentiation among restoration, reconstruction, and interpretation (Pietroni & Ferdani, 2021). These safeguards are especially important in historically dense and culturally diverse destinations such as Iran, where heritage should not be simplified into generic promotional content (Zamani-Farahani & Henderson, 2010; UNESCO, 2003).

A further problem concerns distributional effects. Platforms shape which guides, artisans, family-run accommodations, food producers, and cultural practitioners become visible. Ranking systems may privilege paid promotion, high transaction volume, dominant languages, or digital sophistication, thereby concentrating attention among already advantaged providers (Dredge & Gyimóthy, 2015; Richards, 2018). Accessibility can be marginalised in a similar way when it is treated as an exceptional preference rather than a system-wide design obligation. Recent evidence positions accessibility in AI-enabled cultural tourism as a relational outcome produced by data interpretation, interaction design, and governance across the service ecosystem (Wang et al., 2026).

Kolehposhti is proposed as a response to these connected problems. It is conceived as an AI-enabled tourism platform combining context-aware itinerary support, multilingual interaction, immersive heritage interpretation, verified local participation, and embedded governance. Its intended contribution is not a claim that a functioning platform has already improved satisfaction, learning, or local income. Rather, the article develops a traceable design proposition and asks two questions: RQ1: What functional, informational, stakeholder, accessibility, and governance requirements should an AI-powered smart-tourism platform satisfy? RQ2: How can these requirements be integrated into a coherent and empirically testable socio-technical architecture for Kolehposhti?

2. Conceptual Background

2.1. Context-aware and explainable tourism decision support

Smart-tourism research emphasises the integration of physical destinations, digital services, real-time information, and stakeholder networks (Gretzel et al., 2015; Buhalis & Amaranggana, 2015). Within this setting, recommendation quality is multidimensional. A useful system must combine stable preferences with situational variables and must adapt when a constraint changes. It should also reveal the basis of a recommendation, distinguish facts from predictions, and offer alternatives when information is incomplete. Conversational agents can lower interaction costs, but their benefit depends on information quality, escalation pathways, and the user's ability to correct assumptions (Camilleri & Troise, 2023).

Explainability in tourism is not only a technical matter. Recommendations influence expenditure, time allocation, mobility, perceived safety, and encounters with local communities. Accordingly, a recommendation should be treated as contestable decision support rather than an objective instruction. At minimum, users need intelligible rationales, material constraints, source freshness, uncertainty signals, and the ability to modify preferences. This human-centred approach aligns with responsible-AI guidance on transparency, oversight, and risk management (UNESCO, 2021; National Institute of Standards and Technology, 2023; International Organization for Standardization & International Electrotechnical Commission, 2023).

2.2. Immersive heritage and epistemic integrity

Immersive technologies can extend tourism across pre-visit, on-site, and post-visit phases. They can reveal inaccessible spaces, support spatial understanding, and connect material sites with intangible narratives (Guttentag, 2010; Yung & Khoo-Lattimore, 2019; Chong et al., 2022). Stakeholder research also shows that AR value depends on how visitors, managers, and heritage custodians perceive the experience, not solely on technical novelty (tom Dieck & Jung, 2017).

The central design tension is between engagement and evidential honesty. Photorealistic reconstruction can increase presence while obscuring the degree of historical inference. Kolehposhti therefore requires a provenance model that identifies source type, reconstruction status, authorship, date, and confidence. Where local oral histories or contested narratives

are presented, the platform should preserve plurality rather than collapse disagreement into a single authoritative voice. Immersion is thus conceptualised as an interpretive layer governed by evidence labels and expert review, not as a detached entertainment feature.

2.3. Inclusion, local participation, and platform governance

Tourism platforms mediate reputation and economic opportunity. Participation is not automatically equitable because access to data, ranking rules, language support, and dispute resolution can advantage some actors and silence others (Dredge & Gyimóthy, 2015). A responsible local-provider ecosystem therefore requires verified onboarding, understandable ranking criteria, accessible content submission, reciprocal feedback, and a process for challenging inaccurate content or unfair ratings. Cultural practitioners should be recognised as knowledge contributors as well as service providers (Richards, 2018; UNESCO, 2003).

Digital accessibility and usability must operate across the architecture. Web Content Accessibility Guidelines 2.2 provide a baseline for perceivable, operable, understandable, and robust interaction (World Wide Web Consortium, 2023), while ISO 9241-11 defines usability relative to effectiveness, efficiency, and satisfaction in a specified context of use (International Organization for Standardization, 2018). Accessibility data can itself be sensitive; systems should not infer health conditions or expose user constraints without clear purpose and consent (Wang et al., 2026).

AI-enabled tourism can process location, behavioural preferences, spending patterns, mobility constraints, and language data. Governance must therefore be designed into data flows and decision rights. Relevant principles include purpose limitation, data minimisation, security, explanation, human oversight, auditability, and redress (European Union, 2016; OECD, 2019; UNESCO, 2021). The European Union's AI Act adds risk-sensitive obligations for AI-enabled services, although the legal classification of a particular deployment depends on its functions and context (European Union, 2024). Sustainability is also material: AI can support resource optimisation, but computational demand, rebound effects, and unequal access may undermine social and environmental goals (Gössling & Mei, 2025).

3. Method

3.1. Design-science positioning and unit of analysis

The study adopts a conceptual design-science orientation. Design science develops purposeful artefacts that connect a relevant problem to a reasoned solution and an evaluation strategy (Hevner et al., 2004; Peffers et al., 2007). The artefact here is not software. It is a nascent design theory comprising requirements, design principles, a modular architecture, and an empirical evaluation agenda. Its initial quality is judged through relevance, internal coherence, theoretical grounding, and traceability rather than through claims of deployed performance (Gregor & Hevner, 2013).

The unit of analysis is the proposed Kolehposhti platform as a socio-technical system. A 58-page Persian project brief supplied by the project team was used to identify intended functions, stakeholders, and contextual ambitions. Because that brief contains proposals

rather than validated observations, it was treated only as a design input. No market-size statement, user outcome, technical capability, or commercial projection from the brief was accepted as empirical evidence.

3.2. Evidence identification, coding, and synthesis

An integrative review was selected because the research problem spans tourism, information systems, human-computer interaction, cultural heritage, platform governance, and responsible AI (Torraco, 2005; Okoli, 2015; Snyder, 2019). The analytical corpus contains 44 cited items: peer-reviewed research, methodological sources, and authoritative standards or policy instruments. The original evidence base was updated in August 2026 through targeted title and keyword searches of scholarly indexes and publisher repositories, supplemented by backward chaining from review articles. Search concepts combined smart tourism, tourism recommender systems, generative AI travel planning, immersive heritage, accessibility, local participation, platform governance, explainable AI, and responsible AI.

Sources were retained when they directly informed a design requirement, stakeholder risk, governance control, or evaluation construct. Purely promotional material, unsupported web commentary, and technical work without a clear tourism, user, or governance implication were excluded. The review is design-oriented and not exhaustive. Screening counts and duplicate-removal logs were not retained; consequently, a PRISMA flow diagram is not reported and no claim of systematic-review completeness is made (Page et al., 2021). This limitation is preferable to presenting false procedural precision.

Synthesis proceeded in four stages. First, the project brief and literature were charted against seven provisional domains: travel decision support, personalisation, multilingual mediation, immersive heritage, local participation, accessibility, and governance. Second, recurring opportunities, harms, stakeholder needs, and boundary conditions were coded using a combined deductive and inductive thematic approach (Braun & Clarke, 2006; Hsieh & Shannon, 2005). Third, codes were translated into solution-independent requirements before any module was specified. Fourth, each requirement was mapped to one or more modules, safeguards, and candidate evaluation indicators. Requirements that could not be mapped were treated as architecture gaps rather than omitted.

Table 1: Review and design-synthesis audit trail

Stage	Input or rule	Analytical action	Output and boundary
Problem framing	Two research questions and the project brief	Separate intended functions from evidence claims	Socio-technical unit of analysis; brief treated as non-empirical
Evidence identification	44 cited scholarly, method, standards, and policy items	Targeted search and backward chaining across seven domains	Design-relevant corpus; no claim of exhaustive coverage

Stage	Input or rule	Analytical action	Output and boundary
Eligibility	Direct relevance to requirements, risks, controls, or evaluation	Exclude promotional or unsupported material	Evidence base with explicit inclusion logic
Coding	Problems, opportunities, stakeholders, harms, constraints	Deductive domain coding plus inductive subthemes	Solution-independent requirement statements
Synthesis	Requirements and cross-domain tensions	Map requirements to modules, safeguards, and indicators	Traceable architecture and evaluation agenda
Validation	Traceability, constraint checks, and source triangulation	Identify unmapped requirements and unmitigated risks	Conceptual coherence only; no empirical validation

Source: Authors' synthesis.

3.3. Conceptual validation and limitations of the method

Three checks were used for conceptual validation. Requirement-to-module traceability tested whether the architecture addressed each derived requirement. Cross-domain constraint checking tested whether a feature that created value in one domain introduced an unaddressed risk in another; for example, richer personalisation increases data sensitivity, and immersive realism increases the risk of epistemic overclaiming. Source triangulation compared peer-reviewed findings with standards and policy guidance where technical, ethical, and legal concerns overlapped. These checks strengthen design coherence but do not substitute for user research, technical testing, or stakeholder deliberation.

The coding and synthesis were not independently replicated by multiple reviewers, and no inter-coder reliability statistic is reported. The corpus is English-dominant and may underrepresent Persian-language evidence and local operating constraints. These limitations bound the claims: the method can justify a reasoned design proposition, but it cannot establish causal effects, market demand, legal compliance, or cultural legitimacy.

4. Findings: Requirements and Conceptual Architecture

4.1. Interdependent design requirements

The synthesis produced six interdependent requirement domains. First, contextual decision support requires the system to combine explicit preferences with dynamic conditions while allowing users to revise constraints. Second, explainable human-AI interaction requires rationales, sources, uncertainty, alternatives, and escalation. Third, immersive heritage requires provenance, certainty labels, and expert or community review. Fourth, multilingual and accessible mediation requires multimodal interaction, plain language, correction of translation errors, and accessibility-by-default. Fifth, equitable local participation requires verification, transparent discovery, reciprocal feedback, and contestability. Sixth, embedded

governance requires purpose-limited data, security, moderation, audit trails, exposure monitoring, human oversight, and redress.

These domains cannot be implemented independently. Increasing recommendation relevance through additional personal data creates privacy and discrimination risks. Promoting highly rated providers can reduce search costs while reinforcing cumulative visibility advantages. Generating fluent cultural narratives can improve accessibility while fabricating or flattening contested knowledge. The architecture must therefore connect experience functions to explicit assurance mechanisms.

Table 2: Requirements-to-module traceability matrix

Requirement	Design response	Primary module(s)	Candidate indicator
R1 Context sensitivity	Combine stated preferences with time, place, budget, accessibility, and changing conditions; allow revision	Profile and consent; recommendation engine	Constraint satisfaction; correction rate; itinerary relevance
R2 Explainability and control	Show reasons, sources, material constraints, uncertainty, alternatives, and preference controls	Traveller interface; recommendation engine	Explanation comprehension; trust calibration; override use
R3 Heritage integrity	Label evidence, reconstruction, and interpretation; retain provenance and plural narratives	Immersive heritage; assurance layer	Provenance completeness; knowledge calibration; expert error rate
R4 Multilingual and accessible mediation	Provide multimodal interaction, plain language, translation correction, and accessible flows	Multilingual interface; all experience modules	Task completion by access need; translation repair; WCAG audit
R5 Equitable local participation	Verify providers, disclose ranking factors, support reciprocal feedback, appeals, and multilingual onboarding	Local-provider ecosystem; assurance layer	Exposure concentration; onboarding completion; appeal outcomes
R6 Privacy and security	Use purpose limitation, minimisation, consent, retention controls, secure storage, and audit logs	Profile and consent; assurance layer	Consent comprehension; data-field necessity; incident and deletion metrics
R7 Uncertainty and human oversight	Escalate low-confidence, safety-sensitive, disputed, or culturally sensitive outputs	Multilingual interface; assurance layer	Escalation precision; unresolved-risk rate; response time
R8 Accountability and redress	Record sources and decisions; enable correction, provider challenge, and user complaint pathways	Assurance layer across all modules	Trace completeness; redress resolution; recurrence of upheld errors

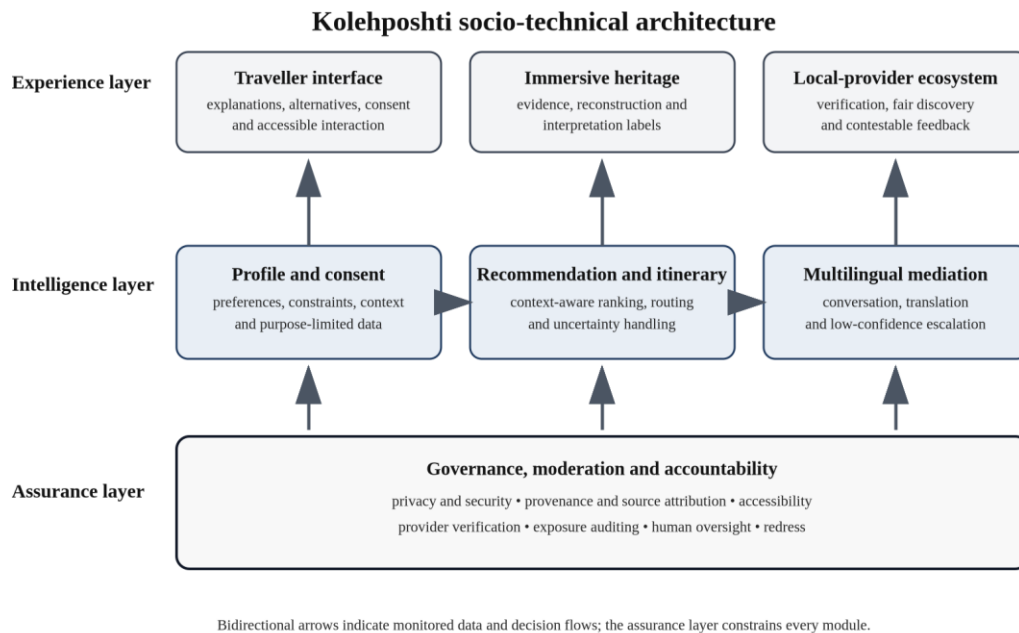
Source: Authors' synthesis.

4.2. Modular socio-technical architecture

Figure 1 integrates the requirements into three layers. The experience layer contains the traveller interface, immersive heritage experiences, and the local-provider ecosystem. The

intelligence layer contains the traveller-profile and consent module, the recommendation and itinerary engine, and multilingual mediation. The assurance layer constrains every other module through governance, moderation, provenance, accessibility, security, auditability, human oversight, and redress.

Figure 1: Kolehposhti socio-technical architecture



Source: Authors' synthesis.

The profile and consent module stores only data needed for declared purposes and separates stable preferences from trip-specific constraints. The recommendation engine combines those inputs with destination and provider information, but it must preserve source freshness, expose material constraints, and return alternatives rather than a single unqualified answer. The multilingual interface mediates conversation and translation while flagging uncertainty and enabling correction or human escalation.

The immersive heritage layer attaches provenance and certainty metadata to each representation. The local-provider ecosystem supports verification, content contribution, service discovery, and dispute resolution. The assurance layer monitors not only data protection and content safety but also representational and distributional effects. Relevant audits include whether low-confidence cultural claims are escalated, whether accessibility information is complete, and whether exposure is persistently concentrated by language, location, provider size, or paid promotion.

The architecture answers RQ1 by specifying functional, informational, stakeholder, accessibility, and governance requirements. It answers RQ2 by integrating those requirements into modules with traceable safeguards and evaluation indicators. The output is deliberately a design proposition: it specifies what a responsible system should be able to

do and how its claims could be tested, not evidence that those outcomes have already been achieved.

5. Discussion

5.1. Theoretical contribution

The first contribution is to operationalise the broad logic of AI-powered smart tourism 2.0 at the platform-architecture level. Koo et al. (2025) describe AI-human integration, virtual layers, and new governance needs across smart-tourism ecosystems. Kolehposhti specifies how those ideas translate into concrete requirements: consent-aware profiles, source-linked explanations, low-confidence escalation, provenance-labelled reconstruction, contestable provider visibility, and cross-layer assurance. The framework thereby connects smart-tourism theory with design decisions that can be inspected and tested.

The second contribution is a richer account of explainability. In this framework, explanation is not a post-hoc statement attached to an algorithmic output. It is a decision-support relationship involving reasons, constraints, data provenance, uncertainty, alternatives, correction, and recourse. This is important because tourism recommendations allocate attention and shape embodied encounters. A technically relevant recommendation may still be unsafe, intrusive, culturally insensitive, or unfair to smaller providers.

The third contribution is the integration of epistemic integrity and distributional fairness. Heritage provenance and provider exposure are often treated as separate content and marketplace issues. Both are consequences of platform mediation: the system decides which narrative appears credible and which provider becomes visible. Treating provenance, plurality, ranking transparency, and contestability as architectural concerns reveals a common governance problem: platforms exercise power over knowledge and opportunity.

5.2. Practical implications and staged development

The framework implies a narrower and more credible development path than a nationwide all-in-one launch. A first prototype should cover a small number of destinations and a curated provider set. Its core test should be whether travellers can create and revise an itinerary while understanding why options are recommended and which information is uncertain. Provider onboarding, accessibility data, and content provenance should be built into that prototype; they should not be deferred until scale.

Immersive features should be introduced selectively where they add interpretive value and source evidence can be documented. A photorealistic reconstruction without an evidential workflow creates more reputational risk than value. Similarly, conversational generation should use retrieval from governed sources, freshness indicators, and safe failure behaviour. Human review is warranted for low-confidence heritage claims, safety-sensitive advice, disputed provider information, and culturally sensitive content.

Operational dashboards should measure more than conversion and engagement. They should include recommendation correction rates, stale-source incidence, accessibility-data

completeness, provider-appeal outcomes, concentration of exposure, and rates of human escalation. Sustainability assessment should also examine infrastructure and model choices rather than assuming that digital delivery is inherently low-impact (Gössling & Mei, 2025).

5.3. Empirical evaluation agenda

Future work should develop a functional prototype and evaluate it through mixed methods. Task-based usability testing can measure effectiveness and efficiency; controlled comparisons can examine explanation and provenance labels; interviews can reveal cultural and trust concerns; provider studies can test onboarding and contestability; and audit data can assess exposure patterns. Validated information-system measures may support satisfaction and system-quality assessment (DeLone & McLean, 2003), while mixed-method integration can connect behavioural outcomes with stakeholder explanations (Creswell & Plano Clark, 2018). Table 3 converts the main design claims into falsifiable evaluation propositions.

Table 3: Testable evaluation propositions for a Kolehposhti prototype

Proposition	Comparison or method	Primary outcomes	Stakeholders
P1 Explanations improve calibrated trust and decision quality	Explanation-enabled versus outcome-only recommendations	Comprehension, confidence calibration, decision quality, correction	Travellers, including first-time users
P2 Provenance labels improve cultural-learning accuracy without unacceptable engagement loss	Labelled versus unlabelled immersive content	Recall, misconception rate, perceived credibility, engagement	Travellers and heritage specialists
P3 Transparent ranking and appeals reduce unjustified provider disadvantage	Audit exposure before and after ranking controls; analyse appeals	Exposure concentration, appeal success, perceived procedural fairness	Local providers and platform moderators
P4 Accessible multimodal flows reduce task failure across access needs	Task-based testing against a baseline interface	Completion, time, error, workload, satisfaction	Disabled users and situationally constrained users
P5 Granular consent improves comprehension without excessive abandonment	Granular, contextual consent versus bundled consent	Comprehension, choice quality, completion, later preference changes	Travellers
P6 Human escalation reduces high-consequence errors	Review low-confidence and disputed outputs with and without escalation	Residual error, harmful advice, resolution time, reviewer agreement	Travellers, guides, heritage experts, moderators

Source: Authors' synthesis.

5.4. Limitations

The framework has four substantive limitations. First, it is conceptual and does not establish usability, recommendation accuracy, technical feasibility, adoption, commercial viability, or local economic benefit. Second, the literature synthesis is targeted rather than systematic, and the single-team coding process can reproduce selection and interpretation bias. Third, international standards and literature may not fully capture Iran's regulatory, infrastructural, linguistic, and behavioural conditions. Fourth, fairness, authenticity, and cultural legitimacy are not engineering variables that can be settled by the development team alone; they require continuing deliberation with affected communities, heritage specialists, disabled users, providers, and public stakeholders.

These limitations mean the framework should be used as a hypothesis-generating and design-governance tool. Claims of impact should remain prohibited until the relevant module has been implemented and evaluated with an appropriate comparator, stakeholder sample, and pre-specified outcome.

6. Conclusion

Kolehposhti is presented as a design-science framework for an AI-powered smart-tourism platform that connects personalised decision support, multilingual mediation, immersive heritage, local participation, accessibility, and governance. Its central argument is that these functions are mutually constraining. Personalisation without consent and explanation can become intrusive; immersion without provenance can become misleading; participation without transparent visibility can reproduce inequality; and accessibility without cross-layer implementation can remain symbolic.

The study contributes a traceable architecture comprising a profile and consent module, a recommendation and itinerary engine, a multilingual interface, an immersive heritage layer, a verified local-provider ecosystem, and a cross-cutting assurance layer. It also provides evaluation propositions for explanation, provenance, accessibility, provider exposure, consent, and uncertainty handling. The present evidence supports the coherence and relevance of this design proposition, not its real-world effectiveness.

The next research stage should build a bounded prototype and test it with travellers, disabled users, local providers, licensed guides, heritage specialists, and destination stakeholders. Only such evidence can determine whether Kolehposhti improves decisions and cultural learning while preserving privacy, local agency, accessibility, and intellectual integrity.

References

- Boes, K., Buhalis, D., & Inversini, A. (2016). Smart tourism destinations: Ecosystems for tourism destination competitiveness. *International Journal of Tourism Cities*, 2(2), 108-124. <https://doi.org/10.1108/IJTC-12-2015-0032>
- Borràs, J., Moreno, A., & Valls, A. (2014). Intelligent tourism recommender systems: A survey. *Expert Systems with Applications*, 41(16), 7370-7389. <https://doi.org/10.1016/j.eswa.2014.06.007>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations enhancing tourism experience through personalisation of services. In I. Tussyadiah & A. Inversini (Eds.), *Information and communication technologies in tourism 2015* (pp. 377-389). Springer. https://doi.org/10.1007/978-3-319-14343-9_28
- Camilleri, M. A., & Troise, C. (2023). Chatbot recommender systems in tourism: A systematic review and a benefit-cost analysis. In *Proceedings of the 2023 8th International Conference on Machine Learning Technologies* (pp. 151-156). Association for Computing Machinery. <https://doi.org/10.1145/3589883.3589906>
- Chong, H. T., Lim, C. K., Rafi, A., Tan, K. L., & Mokhtar, M. (2022). Comprehensive systematic review on virtual reality for cultural heritage practices: Coherent taxonomy and motivations. *Multimedia Systems*, 28(3), 711-726. <https://doi.org/10.1007/s00530-021-00869-4>
- Chung, N., Han, H., & Joun, Y. (2015). Tourists' intention to visit a destination: The role of augmented reality application for a heritage site. *Computers in Human Behavior*, 50, 588-599. <https://doi.org/10.1016/j.chb.2015.02.068>
- Creswell, J. W., & Plano Clark, V. L. (2018). *Designing and conducting mixed methods research* (3rd ed.). SAGE.
- DeLone, W. H., & McLean, E. R. (2003). The DeLone and McLean model of information systems success: A ten-year update. *Journal of Management Information Systems*, 19(4), 9-30. <https://doi.org/10.1080/07421222.2003.11045748>
- Dredge, D., & Gyimóthy, S. (2015). The collaborative economy and tourism: Critical perspectives, questionable claims and silenced voices. *Tourism Recreation Research*, 40(3), 286-302. <https://doi.org/10.1080/02508281.2015.1086076>
- European Union. (2016). Regulation (EU) 2016/679: General Data Protection Regulation. *Official Journal of the European Union*, L119, 1-88. <https://eur-lex.europa.eu/eli/reg/2016/679/oj>
- European Union. (2024). Regulation (EU) 2024/1689: Artificial Intelligence Act. *Official Journal of the European Union*. <https://eur-lex.europa.eu/eli/reg/2024/1689/oj>
- Fan, X., Jiang, X., & Deng, N. (2022). Immersive technology: A meta-analysis of augmented/virtual reality applications and their impact on tourism experience. *Tourism Management*, 91, 104534. <https://doi.org/10.1016/j.tourman.2022.104534>
- Gössling, S., & Mei, X. Y. (2025). AI and sustainable tourism: An assessment of risks and opportunities for the SDGs. *Current Issues in Tourism*. Advance online publication. <https://doi.org/10.1080/13683500.2025.2477142>
- Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. *Electronic Markets*, 25(3), 179-188. <https://doi.org/10.1007/s12525-015-0196-8>

- Gregor, S., & Hevner, A. R. (2013). Positioning and presenting design science research for maximum impact. *MIS Quarterly*, 37(2), 337-355. <https://doi.org/10.25300/MISQ/2013/37.2.01>
- Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637-651. <https://doi.org/10.1016/j.tourman.2009.07.003>
- Hamid, R. A., Albahri, A. S., Alwan, J. K., Al-Qaysi, Z. T., Albahri, O. S., Zaidan, A. A., Alnoor, A., Alamoodi, A. H., & Zaidan, B. B. (2021). How smart is e-tourism? A systematic review of smart tourism recommendation system applying data management. *Computer Science Review*, 39, 100337. <https://doi.org/10.1016/j.cosrev.2020.100337>
- Hevner, A. R., March, S. T., Park, J., & Ram, S. (2004). Design science in information systems research. *MIS Quarterly*, 28(1), 75-105. <https://doi.org/10.2307/25148625>
- Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 1277-1288. <https://doi.org/10.1177/1049732305276687>
- International Organization for Standardization. (2018). *ISO 9241-11:2018: Ergonomics of human-system interaction-Part 11: Usability: Definitions and concepts*.
- International Organization for Standardization & International Electrotechnical Commission. (2023). *ISO/IEC 23894:2023: Information technology-Artificial intelligence-Guidance on risk management*.
- Ivars-Baidal, J. A., Celdrán-Bernabeu, M. A., Femenia-Serra, F., & Perles-Ribes, J. F. (2019). Smart destinations and the evolution of ICTs: A new scenario for destination management? *Current Issues in Tourism*, 22(13), 1581-1600. <https://doi.org/10.1080/13683500.2017.1388771>
- Koo, C., Shin, S., Gretzel, U., Hunter, W. C., & Chung, N. (2016). Conceptualization of smart tourism destination competitiveness. *Asia Pacific Journal of Information Systems*, 26(4), 561-576. <https://doi.org/10.14329/apjis.2016.26.4.561>
- Koo, C., Shin, S., Gretzel, U., & Xiang, Z. (2025). AI-powered smart tourism 2.0: A 10-year retrospective and updated model. *Electronic Markets*, 35, Article 108. <https://doi.org/10.1007/s12525-025-00847-y>
- London Charter. (2009). *The London Charter for the computer-based visualisation of cultural heritage* (Version 2.1). <https://www.londoncharter.org>
- National Institute of Standards and Technology. (2023). *Artificial Intelligence Risk Management Framework (AI RMF 1.0)* (NIST AI 100-1). <https://doi.org/10.6028/NIST.AI.100-1>
- OECD. (2019). *Recommendation of the Council on Artificial Intelligence* (OECD/LEGAL/0449). <https://legalinstruments.oecd.org/en/instruments/OECD-LEGAL-0449>
- Okoli, C. (2015). A guide to conducting a standalone systematic literature review. *Communications of the Association for Information Systems*, 37, 879-910. <https://doi.org/10.17705/1CAIS.03743>
- Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S., ... Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, 372, n71. <https://doi.org/10.1136/bmj.n71>
- Peffers, K., Tuunanen, T., Rothenberger, M. A., & Chatterjee, S. (2007). A design science research methodology for information systems research. *Journal of Management Information Systems*, 24(3), 45-77. <https://doi.org/10.2753/MIS0742-1222240302>

- Pietroni, E., & Ferdani, D. (2021). Virtual restoration and virtual reconstruction in cultural heritage: Terminology, methodologies, visual representation techniques and cognitive models. *Information*, 12(4), 167. <https://doi.org/10.3390/info12040167>
- Richards, G. (2018). Cultural tourism: A review of recent research and trends. *Journal of Hospitality and Tourism Management*, 36, 12-21. <https://doi.org/10.1016/j.jhtm.2018.03.005>
- Seyfi, S., Kim, M. J., Nazifi, A., Murdy, S., & Vo-Thanh, T. (2025). Understanding tourist barriers and personality influences in embracing generative AI for travel planning and decision-making. *International Journal of Hospitality Management*, 126, 104105. <https://doi.org/10.1016/j.ijhm.2025.104105>
- Snyder, H. (2019). Literature review as a research methodology: An overview and guidelines. *Journal of Business Research*, 104, 333-339. <https://doi.org/10.1016/j.jbusres.2019.07.039>
- tom Dieck, M. C., & Jung, T. H. (2017). Value of augmented reality at cultural heritage sites: A stakeholder approach. *Journal of Destination Marketing & Management*, 6(2), 110-117. <https://doi.org/10.1016/j.jdmm.2017.03.002>
- Torraco, R. J. (2005). Writing integrative literature reviews: Guidelines and examples. *Human Resource Development Review*, 4(3), 356-367. <https://doi.org/10.1177/1534484305278283>
- Tussyadiah, I. P., Wang, D., Jung, T. H., & tom Dieck, M. C. (2018). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 140-154. <https://doi.org/10.1016/j.tourman.2017.12.003>
- UNESCO. (2003). *Convention for the safeguarding of the intangible cultural heritage*. <https://ich.unesco.org/en/convention>
- UNESCO. (2021). *Recommendation on the ethics of artificial intelligence*. <https://unesdoc.unesco.org/ark:/48223/pf0000381137>
- Wang, S., Mei, Y.-Q., Yue, J.-C., & Xia, H.-M. (2026). Does artificial intelligence improve accessibility in cultural and heritage tourism? Evidence from a design-led review and the Inclusive Human-AI Mediation (IHAM) framework. *Information Technology & Tourism*, 28, Article 43. <https://doi.org/10.1007/s40558-026-00384-0>
- World Wide Web Consortium. (2023). *Web Content Accessibility Guidelines (WCAG) 2.2*. <https://www.w3.org/TR/WCAG22/>
- Yung, R., & Khoo-Lattimore, C. (2019). New realities: A systematic literature review on virtual reality and augmented reality in tourism research. *Current Issues in Tourism*, 22(17), 2056-2081. <https://doi.org/10.1080/13683500.2017.1417359>
- Zamani-Farahani, H., & Henderson, J. C. (2010). Islamic tourism and managing tourism development in Islamic societies: The cases of Iran and Saudi Arabia. *International Journal of Tourism Research*, 12(1), 79-89. <https://doi.org/10.1002/jtr.741>