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Integrating Advanced Digital Technologies in Event Tourism: Reframing "Quantum Tourism" within Smart Destination Development in Bali

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Abstract

The acceleration of digital transformation in tourism has intensified the need for destinations to adopt advanced technologies to enhance competitiveness and visitor experience. While emerging narratives such as "quantum tourism" have gained attention, the concept remains theoretically ambiguous and empirically underexplored. This study aims to critically examine the role of advanced digital technologies in Bali's event tourism ecosystem and to reassess the conceptual validity of "quantum tourism" within a smart destination framework. A qualitative-dominant mixed-method approach was employed, combining questionnaire data (n = 101) with semi-structured interviews and field observations involving key tourism stakeholders. The findings indicate that while digital technologies—particularly mobile platforms and Internet of Things (IoT)—are widely adopted (92.1%), stakeholders demonstrate limited understanding of advanced technological paradigms labeled as "quantum." This study reframes "quantum tourism" as a metaphorical construct reflecting complexity, interconnectivity, and adaptive systems rather than a distinct technological domain. Managerial implications emphasize the need for realistic digital strategies, capacity building, and evidence-based technology adoption.

Keywords: smart destination; event tourism; quantum technology; tourist experience

INTRODUCTION

Background

Bali's event tourism sector is experiencing a structural paradox: while the island remains a globally recognized destination for festivals, MICE, and cultural events, its planning and management systems continue to rely on linear, retrospective, and fragmented approaches that are

increasingly misaligned with the complexity of contemporary tourism dynamics. The rapid acceleration of digital transformation characterized by real-time data flows, platform-based visitor behavior, and algorithm-driven decision-making has intensified the unpredictability of tourist movements, engagement patterns, and post-event destination loyalty. In high-pressure destinations such as Bali, this mismatch contributes to overcrowding, uneven spatial distribution of tourists, declining experiential quality, and weak integration between event experiences and long-term destination value creation. Despite the emergence of smart tourism frameworks, existing models remain largely deterministic and insufficient in capturing the probabilistic, interconnected, and non-linear nature of tourist decision processes. This study addresses this gap by introducing a quantum tourism perspective, which reconceptualizes tourist behavior as dynamic, multi-state, and entangled across digital and physical environments. By positioning quantum tourism as an advanced analytical and conceptual framework, this research offers a novel approach to understanding how event experiences in Bali can be transformed into sustained destination loyalty within an increasingly complex digital ecosystem.

Event tourism, encompassing festivals and Meetings, Incentives, Conferences, and Exhibitions (MICE), has become a critical driver of destination competitiveness, particularly in destinations seeking to integrate experiential, cultural, and business-oriented travel (Collado-Agudo et al., 2023; Jamieson, 2014). In Indonesia, the strategic importance of tourism is reflected in national policy targets, with the Ministry of Tourism and Creative Economy projecting tourism-generated foreign exchange to reach approximately US$22.1–25.2 billion in 2025. Within this national context, Bali continues to function as a primary tourism hub and a major contributor to Indonesia's tourism economy. Official statistics indicate that Bali recorded 5,273,258 international tourist arrivals in 2023 and increased to approximately 6.3 million in 2024, demonstrating a strong post-pandemic recovery and sustained global demand (Bali Tourism Authority, 2024). This growth is not merely quantitative but reflects a structural shift in tourism dynamics, where event tourism and MICE activities play an increasingly significant role in shaping destination value and visitor engagement (Tirtawati et al., 2024).

Bali's established cultural assets, extensive hospitality infrastructure, and international event-hosting capacity position it as a competitive destination for both leisure and business tourism (Capriello, 2018a; Choe & Mahyuni, 2023; Nguyen & Nguyen, 2024; Qian et al., 2025). At the same time, the ongoing digital transformation of tourism is accelerating the adoption of smart destination strategies, requiring destinations to integrate data-driven management, real-time visitor engagement, and digital experience design into their tourism systems (Buhalis et al., 2023; Zhou et al., 2024). In this context, Bali provides a particularly relevant empirical setting to examine how event tourism and smart destination development intersect. However, existing approaches remain largely deterministic and insufficient to explain the increasingly complex, non-linear, and digitally mediated behavior of tourists. This limitation highlights the need for more advanced conceptual frameworks, such as the emerging notion of quantum tourism, which conceptualizes tourist behavior as probabilistic, interconnected, and dynamically influenced across digital and physical environments.

The rapid advancement of digital technologies in web- and mobile-based platforms has fundamentally reshaped event tourism and the MICE industry, transforming how destinations design, deliver, and manage visitor experiences (Assiouras et al., 2024; Zhou et al., 2024). In destinations such as Bali, this transformation is closely linked to the emergence

of smart tourism systems that rely on real-time data, digital interaction, and platform-based engagement. However, existing smart tourism frameworks remain largely deterministic, assuming stable and linear relationships between tourist preferences, experiences, and behavioral outcomes. Such assumptions are increasingly inadequate in explaining the complexity of contemporary tourist behavior, which is dynamic, context-dependent, and shaped by simultaneous digital and physical interactions.

To address this limitation, this study introduces quantum tourism as a tourism-specific conceptual framework, defined as an approach that model's tourist behavior as probabilistic, non-linear, and interconnected across multiple experiential states, influenced by continuous interactions between digital information environments and on-site experiences. Unlike metaphorical uses of "quantum" across unrelated disciplines, this definition is grounded in decision-making theory and experience dynamics, where tourists simultaneously evaluate multiple possibilities before actualizing choices through travel behavior. Within the context of Bali's event tourism, this perspective enables a more nuanced understanding of how pre-event digital exposure, on-site engagement, and post-event memory formation are entangled in shaping destination loyalty.

However, the implementation of advanced digital and data-driven tourism systems, including those aligned with a quantum tourism perspective, faces significant socio-cultural and technological constraints. In Bali, resistance to technological innovation is partly influenced by the need to preserve cultural values and local practices, which can create tension between modernization and tradition (Zheng et al., 2025). In addition, limited digital capabilities among local stakeholders and small tourism enterprises hinder the effective adoption of advanced systems, reinforcing a persistent skills gap in tourism digitalization (Bartaloni et al., 2025; Vargas-Sevalle et al., 2020). These challenges highlight that the transition toward more sophisticated tourism models is not only a technological issue but also a socio-cultural and governance process that requires alignment between innovation, local values, and stakeholder readiness (Achmad et al., 2023; Hazel & Mason, 2020).

The aim of the study (1) to analyze of quantum theory in hospitality, travel and tourism, particularly its application to event tourism and tourist experiences in Bali; (2) to explore the adoption, implementation of quantum, focuses on Bali as smart destination from the perspectives tourism stakeholders. Understanding stakeholder's perceptions of quantum adoption in tourism is crucial for Bali to tailor strategies that enhance tourist experiences and meet evolving expectations.

LITERATURE REVIEW

Event Tourism and MICE as Drivers of Destination Competitiveness

Event tourism has evolved into a strategic mechanism for enhancing destination competitiveness by integrating cultural, social, and economic value creation within a single tourism product (Getz, 2008). Festivals, hallmark events, and MICE (Meetings, Incentives, Conferences, and Exhibitions) activities are no longer viewed merely as supplementary attractions but as central components of destination development strategies. These events stimulate demand, extend length of stay, reduce seasonality, and enhance destination branding through experiential differentiation (Collado-Agudo et al., 2023; Jamieson, 2014).

Within this context, MICE tourism plays a particularly significant role due to its high economic multiplier effect and its ability to attract high-value visitors with strong spending power and repeat visitation potential (Clark, 2007). Business events also generate long-term impacts by fostering knowledge exchange, investment flows, and destination reputation. In

destinations such as Bali, where cultural richness intersects with global tourism demand, event tourism provides a platform to integrate traditional heritage with modern experiential consumption.

However, the effectiveness of event tourism in generating destination loyalty depends on the quality of visitor experiences before, during, and after events. Recent studies emphasize that memorable event experiences are critical in shaping tourists' cognitive and affective evaluations, which subsequently influence revisit intention and destination advocacy (Nottingham & User, 2013). Thus, understanding how event experiences are constructed and mediated becomes essential in contemporary tourism research.

Smart Tourism and Digital Transformation in Destination Systems

The emergence of smart tourism represents a paradigm shift in how destinations are managed and experienced, driven by the integration of information and communication technologies (ICT), big data, and digital platforms (Buhalis et al., 2023; Zhou et al., 2024). Smart destinations are characterized by their ability to collect, process, and utilize real-time data to enhance decision-making, personalize tourist experiences, and optimize resource management (Alcaraz et al., 2024; Ercan, 2023; Omar et al., 2025) .

Digital transformation has significantly altered tourist behavior, particularly in the context of event tourism. Tourists now interact with destinations across multiple digital touchpoints, including social media, online reviews, event platforms, and mobile applications, which influence their perceptions and decisions long before physical travel occurs (Ahani et al., 2021; Elnur & Akgün, 2025). This shift has led to the emergence of digitally mediated experiences, where the boundaries between previsit anticipation, on-site engagement, and post-visit memory are increasingly blurred.

Despite these advancements, existing smart tourism models often rely on linear and deterministic assumptions, where inputs such as service quality or information availability are expected to produce predictable behavioral outcomes (Ramadhani et al., 2024; Tasci et al., 2022). Such models inadequately capture the complexity of contemporary tourist behavior, which is influenced by uncertainty, emotional variability, and dynamic interactions between multiple information sources (T. W. Kim et al., 2024; Lee et al., 2021a). Consequently, there is a growing need for more advanced conceptual frameworks capable of explaining non-linear and probabilistic tourist decision-making processes.

Toward a Quantum Tourism Perspective

To address the limitations of deterministic models, this study introduces the concept of quantum tourism as a novel theoretical framework for understanding tourist behavior in complex, digitally mediated environments (Chen et al., 2025; Talwar et al., 2023). In this study, quantum tourism is defined as an approach that conceptualizes tourist decision-making and experiences as probabilistic, non-linear, and interconnected processes, shaped by continuous interactions between digital information ecosystems and physical destination encounters.

The theoretical foundation of quantum tourism draws inspiration from quantum decision theory, which challenges classical rational-choice models by recognizing that individuals can exist in multiple cognitive states simultaneously before making a decision (Dinçer et al., 2024; Gao et al., 2024; Quer, 2021). In tourism, this implies that travelers do not follow a single, linear decision pathway but instead navigate a dynamic space of possibilities influenced by emotions, social interactions, and digital stimuli.

Three key principles underpin the quantum tourism framework:

1) Superposition of Tourist States (Dass, 2013)

Tourists simultaneously consider multiple destinations, experiences, and expectations before committing to a decision. In event tourism, this is evident in how potential visitors evaluate multiple events, destinations, and schedules through digital platforms.

2) Entanglement of Experiences (Schreyer et al., 2025)

Tourist experiences are interconnected across different stages of the travel journey. Pre-event digital exposure (e.g., social media content), on-site event participation, and post-event memory sharing are not independent but mutually reinforcing processes that shape overall destination perception.

3) Interference of Digital Information (Lee et al., 2021a; Ziyadin et al., 2019)

Digital content, such as online reviews, influencer narratives, and algorithm-driven recommendations, interacts in complex ways to influence tourist perceptions and decisions. This can amplify or diminish destination attractiveness in unpredictable ways.

By incorporating these principles, quantum tourism provides a more flexible and realistic framework for analyzing tourist behavior in smart destinations. It shifts the focus from static variables to dynamic processes, enabling researchers to better capture the complexity of event-based tourism experiences.

Linking Event Experiences to Destination Loyalty

A central concern in tourism research is understanding how experiences translate into destination loyalty. Loyalty is typically conceptualized as a combination of behavioral intention (e.g., revisit intention) and attitudinal commitment (e.g., positive word-of-mouth) (Fan et al., 2024; Goyal & Taneja, 2023). In the context of event tourism, memorable experiences play a critical role in shaping these outcomes.

Memorable tourism experiences (MTEs) are defined as experiences that are positively remembered and recalled after the travel event, often characterized by emotional intensity, novelty, and personal significance (Bolter & Stadler, 2025; J.-H. Kim, 2025). In event settings, factors such as event quality, cultural authenticity, social interaction, and atmosphere contribute to the formation of MTEs.

From a quantum tourism perspective, the relationship between experience and loyalty is not linear but mediated by dynamic interactions across multiple stages of the tourist journey. For example, a tourist's pre-event expectations (formed through digital exposure) may interact with on-site experiences to produce either reinforcement or disconfirmation, which in turn influences post-event memory and loyalty (S. Kim et al., 2013; Li et al., 2026). This suggests that destination loyalty emerges from a complex interplay of cognitive and emotional processes rather than a simple cause-and-effect relationship.

Socio-Cultural and Technological Constraints in Adoption

While the quantum tourism framework offers a novel approach to understanding tourist behavior, its practical implementation faces several challenges, particularly in destinations characterized by strong cultural identities and varying levels of technological readiness. In Bali, tourism development is deeply embedded within local cultural values, such as *Tri Hita Karana*, which emphasizes harmony between humans, nature, and spirituality. These values can influence stakeholder attitudes toward technological innovation, creating a need to balance modernization with cultural preservation.

Research indicates that resistance to technological adoption in tourism is often linked to perceived risks, lack of digital skills, and concerns about the erosion of

cultural authenticity (Osti & Goffi, 2021; Vargas-Sánchez et al., 2020). Small and medium-sized tourism enterprises (SMEs), which dominate Bali's tourism sector, frequently face resource constraints that limit their ability to adopt advanced digital systems.

Moreover, the transition toward more complex, data-driven tourism models require not only technological infrastructure but also institutional support, governance frameworks, and capacity-building initiatives. Without these elements, the benefits of smart and quantum tourism approaches may not be fully realized.

Conceptual Implications

This study contributes to tourism theory by integrating event tourism, smart destination development, and quantum-inspired decision frameworks into a unified analytical model. By doing so, it extends existing tourism theories in three keyways. First, it moves beyond deterministic models to incorporate probabilistic and non-linear perspectives on tourist behavior. Second, it highlights the role of digital ecosystems in shaping tourism experiences and outcomes. Third, it provides a conceptual foundation for analyzing how event tourism can generate long-term destination loyalty in complex and dynamic environments.

The application, adoption and implementation of quantum to tourism, hospitality and travel service industries are shown as Tabel 1.

Table 1. The Adoption and Implementation of Quantum to Tourism, Hospitality and Travel Service Industries

No.	Topic	Application – Result	Author/ Researcher
1.	Intelligent Technologies and Applications in Smart Tourism	Due to the popularity of mobile technologies and applications, smart tourism undoubtedly changes consumers' and providers' behavior	(Si-tou, 2024)
2	Artificial Intelligence's impact on hospitality and Tourism Marketing	AI impact organizational functions support stakeholders; AI trends contributed hotel marketing. The findings indicate that if hospitality-tourism industries are to be sustainable, they are challenged to redesign their structures and business processes during the technology adoption process.	(Bulchandgidumal et al., 2024)
3.	AI in Hospitality, Travel and Tourism: Opportunity or Threat?	The findings indicate that if hospitality, travel, tourism industries are to be sustainable, they are challenged to redesign their structures and business processes during the technology adoption process.	(Shu, 2024)
4.	VR & AR to the Tourism Experience	Technology while providing a better understanding of how each technology can be used to generate effective tourist experiences.	(Bretos et al., 2024)

No.	Topic	Application – Result	Author/ Researcher
5.	VR in Tourism and Hospitality	Virtual reality is currently used to enhance travelers' experience, providing destinations, attractions, and businesses with additional marketing tools, reshaping consumer experiences, and generating a new model of tourism.	(Maria de Lurdes Calisto & Saumodip Sankar, 2024)
6.	Hotel Guest and Robot	Understanding hotel guests' perception of interaction with service robots	(Fang et al., 2024)
7.	Virtual Tourism	Virtual tourism: smartphones, augmented reality, virtual reality, big data, and AI/ML are recasting the virtual tourism experience.	(S. Verma et al., 2022)
8.	BlockTour; Impact Blockchain (DLT) to Tourism	A Blockchain based smart tourism platfom;Collaborative approach among the stakeholders and establishment of relevant policies are needed	(Luo & Jing Zhou, 2021; Rana et al., 2022)
9.	Convergence of IoT in Tourism Industry	The industry is a complex interaction of several stakeholders and ancillaries working together for the experience of the tourist. It includes host government, local population, attractions, transportation, accommodation, food and beverages, tightly embodying the local trade, art, craft, festivals, religion, culture and many more.	(A. Verma et al., 2021)
10.	VR on information sharing and seeking behavior; presence for tourism marketing	VR is significantly more effective than traditional media in evoking positive emotional responses to the stimuli; media richness positive influences customer's informatioan search and sharing behaviour.	(Lee et al., 2021b; Yung et al., 2021)
11.	VR & AR technology for Tourism and Hospitality	Highlight top technologies for Tourism and Hospitality with regard to AR and VR. VR and AR are proving their worth especially when planning, marketing, education, tourist sport preservation coming to light.	(Nayyar et al., 2018)

METHOD

Research Design

This study adopts a qualitative research design grounded in grounded theory methodology to develop a conceptual understanding of how event tourism, digital transformation, and emerging quantum tourism perspectives interact within the context of Bali. Grounded theory is particularly suitable for this study because it enables the development of theory inductively from empirical data, especially in areas where conceptual frameworks are still emerging and insufficiently defined (Qian et al., 2025). Rather than testing pre-established hypotheses, this study seeks to generate a tourism-specific conceptualization of quantum tourism grounded in the lived experiences, perceptions, and practices of tourism stakeholders. The research follows a constructivist grounded theory approach, emphasizing the co-construction of meaning between researcher and participants.

Research Context

The study is situated in Bali, Indonesia, a globally recognized tourism destination with a strong emphasis on event tourism and MICE activities, alongside increasing adoption of digital technologies in tourism management. Bali provides a relevant empirical setting due to its dynamic interaction between traditional cultural values and contemporary tourism innovation, making it suitable for exploring emerging conceptual frameworks such as quantum tourism.

Sampling Strategy

This study employs theoretical sampling, a key principle in grounded theory, where data collection is guided by the evolving analysis rather than predetermined sample size (Matteucci & Gnoth, 2017; Qian et al., 2025). Participants were selected based on their relevance to the research focus, including Event organizers and MICE practitioners, Hotel and hospitality managers, Tourism service providers, Local community representatives involved in tourism, Digital platform users and tourism stakeholders. Initial participants were identified purposively, and subsequent participants were selected iteratively to explore emerging categories and refine conceptual insights. Data collection continued until theoretical saturation was reached, defined as the point at which no new significant insights or categories emerged from additional data.

Data Collection

Data were collected through multiple qualitative methods to ensure depth and richness of insights: (1) In-depth Semi-Structured Interviews: Interviews were conducted with tourism stakeholders to explore their experiences, perceptions, and responses to event tourism, digital transformation, and emerging technological concepts. Interview questions were flexible and evolved throughout the research process in line with grounded theory principles; (2) Participant Observation: Observations were conducted at tourism sites, event venues, and hospitality settings to capture real-world practices and interactions related to event tourism and digital engagement; (3) Digital Contextual Data: Supplementary insights were drawn from digital platforms (social media, online reviews, event promotion channels) to understand how digital environments shape tourist experiences and decision-making. All interviews were recorded (with consent), transcribed verbatim, and prepared for analysis.

Data Analysis

Data analysis followed the systematic grounded theory coding process, conducted iteratively and concurrently with data collection: (1) Open Coding. Initial coding involved breaking down the data into discrete units and identifying key concepts related to event experiences, digital interaction, and perceptions of emerging tourism innovation; (2) Axial Coding. Codes were then organized into categories

by identifying relationships between concepts, such as connections between digital engagement, tourist expectations, and experiential outcomes; (3) Selective Coding. A central category was identified, integrating all major categories into a coherent theoretical framework. This process led to the conceptualization of quantum tourism as a dynamic and interconnected system of tourist experiences and decision-making processes; (4) Constant Comparative Method. Data were continuously compared across interviews, observations, and contexts to refine categories and ensure analytical consistency; (5) Memo Writing. Analytical memos were maintained throughout the research process to document emerging ideas, relationships, and theoretical insights. Through these steps, the study developed a grounded conceptual framework explaining how event tourism experiences and digital interactions contribute to destination loyalty within a quantum tourism perspective.

Trustworthiness and Rigor

To ensure the quality and rigor of the study, several strategies were employed: (1) Credibility: Prolonged engagement with the field and triangulation of data sources (interviews, observations, digital data); (2) Dependability: Clear documentation of the research process and coding procedures; (3) Confirmability: Use of reflexive memoing to reduce researcher bias ; (4) Transferability: Thick description of the Bali context to allow applicability to similar destinations. These criteria align with established qualitative research standards (Dwyer et al., 2012; Shaheer et al., 2022a).

Ethical Considerations

All participants were informed about the purpose of the study and provided consent prior to participation. Confidentiality and anonymity were ensured throughout the research process. Participants had the right to withdraw at any stage without consequence.

Theory

Collaboration Quantum and Tourism

Quantum tourism in this study is not conceptualized as the direct application of quantum physics or quantum field theory to tourism products, but rather as a theoretical lens for understanding complex tourist behavior and experience formation in digitally mediated environments. Prior studies have often used the term “quantum” metaphorically or inconsistently, leading to conceptual ambiguity. To address this limitation, this study adopts a discipline-grounded definition, positioning quantum tourism as a non-linear, probabilistic, and interconnected model of tourist decision-making and experience construction, informed by developments in quantum decision theory (Sarkar, 2016; Singh, 2006; Song et al., 2024) rather than physical science applications.

Within this framework, quantum tourism is analytically distinct from related concepts. Smart tourism refers to the technological infrastructure and data-driven management of destinations (Buhalis et al., 2023; Zhou et al., 2024),while digital tourism focuses on platform-mediated interactions and information exchange (Jiang et al., 2023). Immersive experiences, in turn, emphasize sensory and emotional engagement during on-site participation (John et al., 2024; Satrya et al., 2024). In contrast, quantum tourism operates at a higher conceptual level, explaining how these elements interact dynamically across time and space to shape tourist perceptions, choices, and loyalty outcomes.

Accordingly, quantum tourism is defined in this study as: *A conceptual framework that models tourist behavior and experience as probabilistic, non-linear, and interconnected processes emerging from continuous interactions between digital environments, physical experiences, and socio-cultural contexts.*

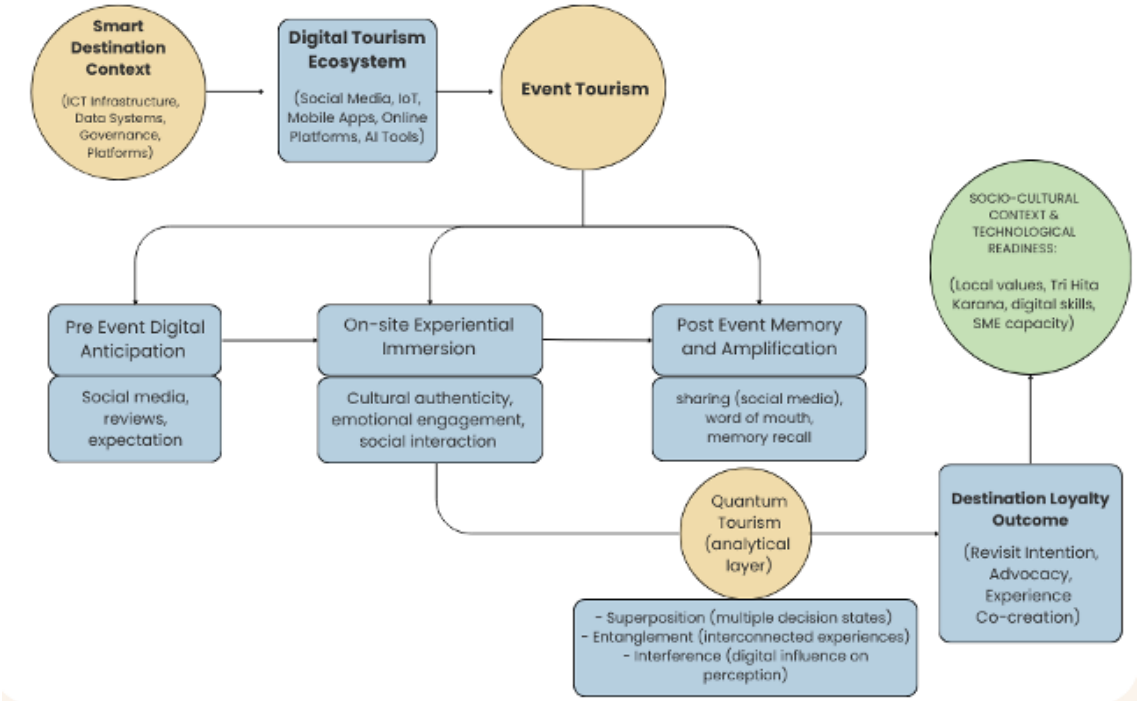

Figure 1. Quantum Tourism and Event Tourism to Destination Loyalty Framework (Source: Research Framework, 2025)

Tourism can adopt the quantum characteristics. Quantum Field theory (QFT) (Adami & Sigmaringo, 2023; Falcone & Conti, 2024) is a theoritical framework in physic that combines classical field theory, special relativity, and quantum mechanics. While QFT is primarily used in particle physics and condensed matter physics, its principal and methodologis can offer insight into various fields, including tourism. Some potential lesson that could be drawn from QFT and applied to tourism (Qiu et al., 2023); (1) complex system analysis, (Bonab et al., 2023a; Germine, 1991; Omol, 2024; Speirs, 2024a) including interconnectedness and network system. In tourism, the QFT application used to understanding how different elements of tourist experience, such as accommodation, attactions, transportation (Asher Peres, 2002; Rooney et al., 2023a); (2) QFT can applied to managing uncertainty in tourist behaviour and preferences, for example understanding that tourists may have varying intereset and preferences can help in tailoring experiences more effectively (Quantum Travel Processing Training, n.d.; Speirs, 2024; Tian, 2024); (3) the need for adaptability in QFT due to the probabilistic nature of quantum phenomena can be translated into tourism by being responsive to changing tourist demands and preferences; (4) Scability in QFT can be applied by ensuring that tourist experiences are scalable-wheter it's a small group tour or a large-scale event; (5) QFT integration, can be seen as analogous to integrating different aspects of tourist experience, such as cultural, recreational, educational activities, to create a holistic experience (Capriello, 2018b); (6) quantum domains is new properties at different scales in QFT, similarly in tourism, new experiences or attractions can emerge from combining different elements or services in innovative ways (Kutlu & Ayyildiz, 2021); (7) Experimental proposal in QFT aimed at verifying quantum phenomena can be seen as analogous to experimental approaches in tourism research aimed at understanding tourist behavior and preferences (Duan & Wu, 2024; Shaheer et al., 2022b).

RESULTS AND DISCUSSION

Repondents Profile

Table 2 presents the demographic and professional profile of respondents involved in this study. The sample (N = 101) consists of a diverse range of tourism stakeholders, including academics, industry practitioners, professionals, and media actors. The largest proportion of respondents are tourism academics and students (44.6%), followed by industry practitioners (29.7%), reflecting the study's emphasis on both knowledge development and practical application. In terms of age distribution, the sample is dominated by respondents under 25 years old (51.5%), indicating a strong representation of younger generations who are more exposed to emerging tourism concepts and digital innovation. Regarding conceptual awareness, 57.4% of respondents reported familiarity with the term "quantum tourism," suggesting partial diffusion of the concept within the tourism community. However, perceptions of implementation remain divided, with 56.4% associating quantum tourism with cultural practices and only 45.5% linking it to technological applications. This finding indicates that the concept is currently interpreted more through local cultural contexts than through advanced technological systems. Furthermore, while smartphone usage is nearly universal (92.1%), the adoption of advanced technologies such as IoT and AI remains limited (7.9%), highlighting a gap between basic digital engagement and more sophisticated technological integration in Bali's tourism sector. Figure 3 shown the stakehoders perception on quantum tourism.

Table 2. Respondents Profile

Category	Sub-category	Description / Criteria	Sampling Rationale	n	%
Stakeholder Group	Tourism Academics / Students	Individuals affiliated with tourism institutions (lecturers, students)	Represent emerging knowledge and familiarity with new concepts (quantum tourism)	45	44.6
	Tourism Industry Practitioners	Hotel staff, event organizers, tourism service providers	Provide practical insights into event tourism operations and digital adoption	30	29.7
	Tourism Professionals	Consultants, managers, tourism entrepreneurs	Represent decision-making and strategic perspectives	15	14.9
	Media & Creative Industry	Tourism media, content creators	Reflect digital engagement and destination representation	11	10.8
Age Group	< 25 years	Young generation (students, early-career professionals)	Key target group for emerging concepts and innovation adoption	52	51.5
	25–40 years	Mid-career professionals	Active workforce with operational and managerial roles	32	31.7
	> 40 years	Senior professionals	Strategic and leadership perspectives	17	16.8

Category	Sub-category	Description / Criteria	Sampling Rationale	n	%
Knowledge of Quantum Tourism	Aware	Respondents who have heard/understand the term	Indicates diffusion of new concept	58	57.4
	Not Aware	No prior knowledge	Reflects conceptual novelty and limited dissemination	43	42.6
Perceived Implementation	Culture-Based	Quantum tourism reflected in cultural practices	Indicates dominance of local cultural interpretation	57	56.4
	Technology-Based	Quantum tourism linked to digital/tech systems	Reflects limited technological integration	46	45.5
Technology Usage	Smartphone Use	Use of smartphones in tourism work	Baseline digital engagement in tourism sector	93	92.1
	Advanced Technologies (IoT, AI, etc.)	Use of advanced or emerging technologies	Indicates low adoption of advanced systems	8	7.9

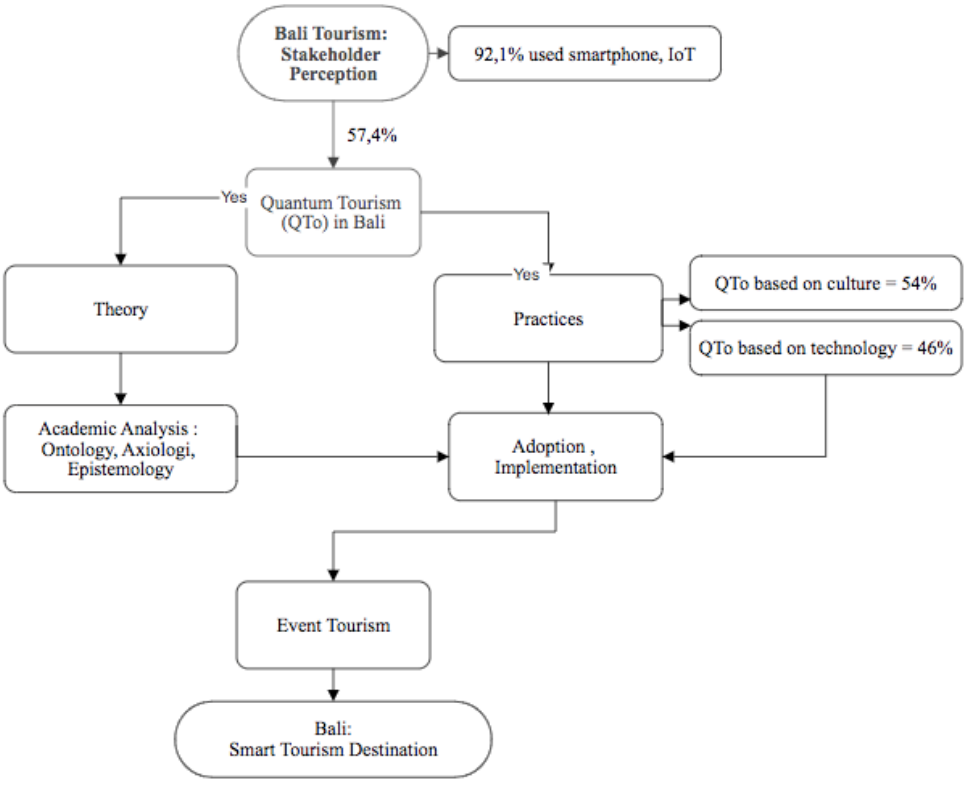

Figure 2. Stakeholder's Perception on Quantum Tourism
(Source: Research Findings, 2025)

Quantum Adoption and Implementation to Event in Bali

The Internet of Things (IoT) remains a dominant technological driver in tourism digitalization, enabling real-time data exchange, operational efficiency, and enhanced service delivery across tourism systems (Si-Tou, 2024; Tribe & J. Liburd,

2016). In Bali, tourism stakeholders have widely adopted IoT-enabled tools—particularly smartphones and platform-based applications—for routine operations, communication, and service coordination. These findings confirm that the current stage of technological development in Bali's tourism sector is largely aligned with digital and smart tourism paradigms, rather than advanced or emerging technological frameworks.

Importantly, this study does not position quantum tourism as a replacement or rebranding of existing digital technologies such as IoT. Instead, quantum tourism is introduced as a conceptual and analytical framework that explains the complexity of tourist behavior and experience formation within these digitally enabled environments (Koç et al., 2024; Koo et al., 2025). While IoT and related technologies provide the infrastructure and data ecosystem, they do not fully capture the non-linear, probabilistic, and interconnected nature of tourist decision-making processes observed in this study (Görçün et al., 2025).

Therefore, the relevance of quantum tourism lies not in technological novelty, but in its ability to offer a theoretical extension beyond conventional smart tourism models, providing a more nuanced explanation of how digital interactions, event experiences, and socio-cultural contexts dynamically interact to shape tourism outcomes. This distinction is critical to avoid conflating quantum tourism with existing digital technologies and ensures that the concept is grounded in behavioral and experiential theory rather than technological relabeling.

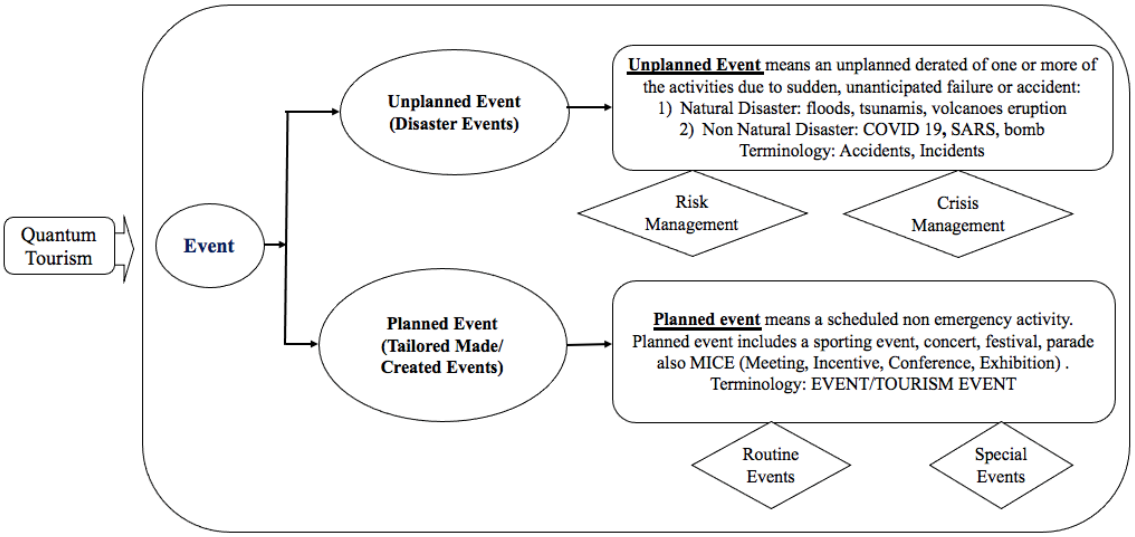

Figure 3. Quantum Tourism to Event Model (Source: (Arndt et al., 2011; Getz, 2007; Mahadewi et al., 2025; Matthews & Matthews, 2020; Orús et al., 2019; Ryan & Werner, 2025; Xu et al., 2022)

The empirical findings indicate that technological transformation in Bali's MICE sector is primarily driven by digital and smart tourism infrastructures rather than what can be classified as "quantum technology." Evidence from semi-structured interviews with MICE business owners and event organizers reveals that the adoption of advanced digital tools has accelerated significantly, particularly in the post-pandemic period, when conferences transitioned from fully offline formats to virtual and subsequently hybrid configurations (Gonwirat et al., 2026). These insights are further supported by field observations at event venues and conference settings, where the integration of Internet of Things (IoT)-enabled

systems—such as online registration platforms, digital participant verification, real-time event applications, and live broadcasting technologies—has become standard practice.

In addition, questionnaire results (N = 101) show that 92.1% of respondents rely on smartphones as their primary technological tool in tourism-related activities, confirming the widespread adoption of basic digital infrastructure, while more advanced systems remain limited (Edeh et al., 2025). These findings suggest that the current technological landscape in Bali's MICE industry is best understood within the smart tourism paradigm, where digital connectivity enhances operational efficiency and visitor experience (Brescó de Luna & Wagoner, 2025; Buhalis et al., 2023; Halim & Mokhtar, 2016). Importantly, this study does not interpret these developments as evidence of "quantum technology" adoption in a literal or technological sense. Instead, these empirically observed digital transformations provide the contextual foundation for applying a quantum tourism perspective as a theoretical lens. From this perspective, the shift toward hybrid and digitally mediated conferences reflects increasingly non-linear and interconnected experience structures, where pre-event digital engagement, on-site participation, and post-event interaction occur simultaneously and influence each other dynamically.

Furthermore, both interview data and observational findings indicate that the adoption of digital technologies in MICE events also supports sustainability objectives, particularly through the reduction of paper use and resource consumption. This aligns with Indonesia's broader agenda for sustainable and green tourism development and reflects growing international expectations for environmentally responsible event management. Thus, rather than representing a new technological category, these developments reinforce the argument that quantum tourism should be understood as an analytical framework that explains how digital infrastructures, event experiences, and sustainability practices interact within complex tourism systems.

Figure 4. Adoption, Application, Implementation Quantum Tourism on Meeting & Conference Event (Source: Tirtawati et al., 2024, Courtesy Melali MICE, 2024)

CONCLUSION

This study set out to examine how event tourism experiences, digital transformation, and stakeholder perspectives interact within the context of Bali, and to explore the relevance of a quantum tourism perspective as an analytical framework. The findings indicate that tourism experiences in Bali's event and MICE sector are shaped through a non-linear and interconnected process involving pre-event digital anticipation, on-site experiential immersion, and post-event memory amplification. These stages are not discrete but dynamically influence each other, contributing to the formation of destination loyalty.

Empirical evidence from interviews, observations, and questionnaire data (N = 101) shows that Bali's tourism stakeholders have widely adopted basic digital technologies, particularly smartphones and platform-based applications, while the use of more advanced systems remains limited. Respondents tend to interpret "quantum tourism" more in relation to cultural values and experiential dimensions rather than technological innovation. This suggests that the concept is currently understood contextually and interpretively, rather than as a clearly defined technological or operational model.

Importantly, the study does not find evidence of the direct implementation of "quantum technology" in Bali's tourism industry. Instead, the contribution of this research lies in proposing quantum tourism as a conceptual framework that helps explain the complexity of tourist behavior and experience formation within digitally mediated environments. By applying grounded theory, the study demonstrates that tourist decision-making and experience construction are probabilistic, multilayered, and influenced by continuous interactions between digital systems, physical environments, and socio-cultural contexts.

These findings provide three key contributions. First, they extend event tourism research by emphasizing the processual and dynamic nature of experience formation, rather than treating it as a linear sequence. Second, they reinforce the role of digital ecosystems in shaping tourism experiences, while highlighting the gap between basic digital adoption and more advanced technological integration. Third, they clarify the position of quantum tourism as a theoretical lens rather than a technological innovation, addressing previous ambiguity in its use.

However, this study has several limitations. The sample is relatively concentrated among younger respondents and academic groups, which may influence perceptions of emerging concepts. In addition, the qualitative orientation and contextual focus on Bali limit generalizability to other destinations. Future research should expand the sample to include broader stakeholder groups, apply comparative destination analysis, and further refine the operationalization of quantum tourism within tourism studies.

In conclusion, this study suggests that the future development of Bali's tourism industry will depend not only on technological investment but also on the ability to integrate digital transformation with cultural context and stakeholder readiness. Rather than introducing new technologies, the concept of quantum tourism offers a useful analytical perspective for understanding how complex tourism systems evolve in an increasingly interconnected and dynamic environment.

AI USE STATEMENT

The authors declare that artificial intelligence (AI) tools were used only for minor language editing and proofreading purposes. No AI tools were used in the development of research design, data analysis, interpretation, or conclusions. All content reflects the authors' original scholarly work, and the authors take full

responsibility for the integrity and accuracy of the manuscript.

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