

Research Article

Technopreneurship and Sustainability in Cultural Heritage Tourism: A Systematic Literature Review on Consumer Behaviour

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Abstract: Digital transformation and technopreneurship are redefining tourism by changing how destinations and firms create value, interact with tourists, and communicate sustainability commitments. This study systematically reviews how technopreneurship, sustainability-oriented marketing, and digital transformation shape consumer behavior in cultural heritage tourism. Recent tourism research has increasingly connected sustainable marketing practices, digital engagement, and behavioral outcomes such as revisit intention, loyalty, recommendation, and environmentally responsible action. However, the literature is still fragmented across general tourism, destination branding, and heritage-specific experience studies. Evidence from the attached dataset also shows that the field remains heavily concentrated in mainstream tourism settings, is dominated by quantitative approaches, and focuses mainly on social-media-based tools, while heritage and cultural tourism receive far less direct attention. The review, therefore, addresses an important gap by repositioning cultural heritage tourism as a distinct context in which sustainability, authenticity, and consumer meaning-making must be understood together rather than separately. Following the PRISMA 2020 framework and a thematic synthesis approach, this review identifies the main drivers, mechanisms, and outcomes discussed in recent studies. The findings indicate that consumer responses in heritage tourism are rarely shaped by digital promotion alone. Instead, behavioral outcomes are more often formed through indirect pathways involving trust, perceived value, authenticity, emotional engagement, place attachment, and satisfaction. In particular, storytelling, authentic place interpretation, and culturally meaningful experiences play an important role in strengthening value co-creation, emotional resonance, and intention to revisit or recommend heritage destinations. The review also shows that sustainability marketing can support pro-environmental and loyalty-related behavior when it is communicated through emotionally relevant and value-based mechanisms rather than through symbolic promotion alone. Overall, this study argues that digital transformation in cultural heritage tourism should be re-framed not merely as a communication tool, but as a strategic technopreneurial capability that enables sustainable heritage value creation, stronger consumer relationships, and more meaningful long-term destination competitiveness.

Keywords: Consumer behavior, technopreneur, sustainability marketing, heritage tourism.

1. Introduction

Heritage tourism has become an increasingly strategic domain in the contemporary tourism economy because visitors are no longer seeking only physical travel experiences, but also meaningful encounters with history, culture, craftsmanship, and place identity. And especially in Indonesia, it is undergoing a structural shift from a volume-driven industry toward a value-driven ecosystem in which destinations are expected to create economic benefits while preserving culture, strengthening

community identity, and communicating environmental responsibility. This shift is especially relevant in cultural heritage tourism, where visitor experience is inseparable from authenticity, memory, symbolism, and place meaning. Based on the attached figures, this transformation is occurring in a highly digital environment: social media remains one of the main spaces where people search for content, follow public conversations, discover products, and form preferences, while domestic tourist mobility in Indonesia continues to expand strongly, as reflected in the growth of Wisatawan Nusantara Travel in 2025. At the same time, the AI adoption profile shown in the third figure suggests that most users are no longer purely resistant to digital technologies, although acceptance remains uneven across generational groups. Together, these patterns indicate that tourism consumer behavior is increasingly shaped before, during, and after travel by digital interaction, algorithmic exposure, and platform-mediated meaning construction rather than by offline promotion alone. Recent studies confirm that tourism experiences are now actively co-created on digital platforms, while digitalization in tourism has become closely linked to agility, customer value creation, and new forms of service design (W. Q. Chen et al., 2025; Huang et al., 2024; Lin et al., 2025)



Figure 1. Travelling and Domestic Tourism Destination in Indonesia 2025

Within this context, technopreneurship becomes highly relevant to heritage tourism because it captures the entrepreneurial capacity of destinations, SMEs, and tourism actors to use digital tools not merely for promotion, but for innovation, interpretation, and sustainable value creation. Recent evidence shows that digital transformation in tourism organizations is associated with stronger innovation capacity, business model renewal, and more adaptive ways of creating value for visitors. This is important for heritage destinations because they must balance market visibility with cultural integrity. In practice, technopreneurial action may involve digital storytelling, immersive interpretation, AI-assisted personalization, smart branding, platform collaboration, and data-informed engagement strategies. Such capabilities matter because cultural heritage tourists do not respond only to information exposure; they respond to how destinations translate heritage into experiences that feel credible, meaningful, and emotionally resonant. Studies in heritage and cultural tourism show that authenticity, cultural experience, place attachment, and satisfaction are strong predictors of conservation intention, recommendation, and revisit intention. Likewise, engagement has been shown to influence revisit intention across physical, technology-enhanced, and virtual

visitation formats, while sensorial narrative-based guiding can strengthen emotional connection and memory formation in heritage settings (Santarsiero et al., 2024).



Figure 2. Artificial Intelligence User Topology

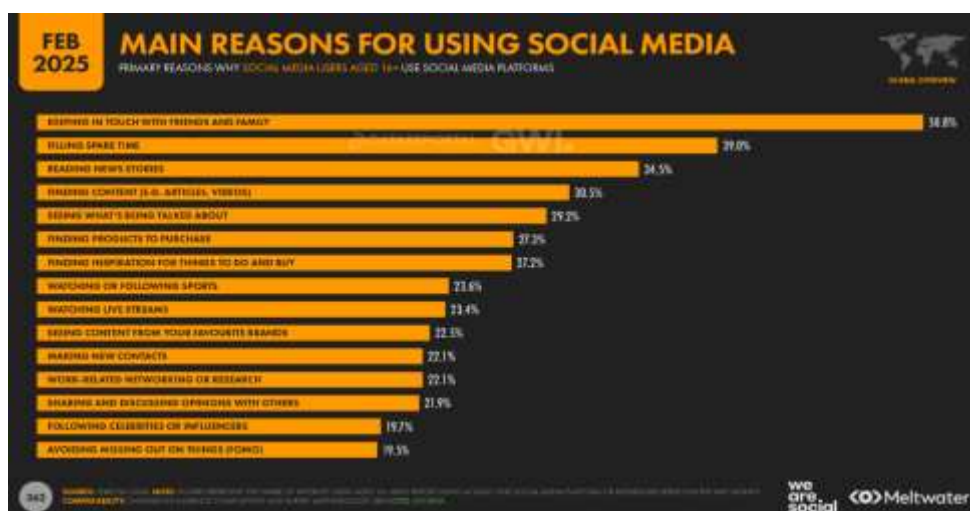


Figure 3. Social Media Used in Reasons 2025

At the same time, the literature for using Social Media for searching relaxing destinations increasingly suggests that sustainability marketing influences tourism behavior most effectively when it moves beyond symbolic green claims and works through trust, value, emotion, and participation. Research in tourism and hospitality shows that sustainable destination branding, green brand equity, digital nudging, and sustainability-oriented social media content can shape environmentally responsible behavior, loyalty, and customer retention. This matters for heritage tourism because heritage destinations are not only consumed as attractions; they are judged as moral, cultural, and ecological propositions. Visitors are more likely to revisit, recommend, protect, or support a heritage destination when sustainability messages are embedded in authentic stories, participatory experiences, and culturally grounded value propositions. However, the literature remains fragmented. Digital transformation is often discussed separately from sustainability marketing, and both are still insufficiently integrated with heritage-specific consumer behavior mechanisms. Therefore, this review positions cultural heritage tourism as a distinct analytical setting in which

consumer behavior, technopreneurship, and sustainability marketing must be understood as interdependent rather than isolated constructs (Aziz & Niazi, 2025).

Based on these issues, this study aims to synthesize recent literature on the relationships among sustainability marketing, technopreneur tourism, heritage tourism, and customer behavior, and to build an integrative conceptual framework for future research. So, the study is guided by the following research questions:

1. **RQ1:** How has the literature on sustainability marketing, technopreneur tourism, heritage tourism, and customer behavior evolved in recent years?
2. **RQ2:** What key antecedents drive customer behavior in heritage tourism under sustainability-oriented and digitally enabled marketing conditions?
3. **RQ3:** Through what mediating mechanisms do sustainability marketing and technopreneurial digital interactions influence outcomes such as revisit intention, loyalty, recommendation, and responsible behavior?
4. **RQ4:** What conceptual, contextual, and methodological gaps remain for future research, particularly in heritage destinations shaped by SMEs, tourism villages, and community-based enterprises?

2. Literature Review

Consumer Behavior in Cultural Heritage Marketing

Consumer behavior in cultural heritage marketing refers to how tourists perceive, evaluate, and respond to heritage-based experiences, which are often shaped by cultural meaning, authenticity, and sustainability considerations. tourist behavior in heritage contexts is strongly influenced by intangible factors such as cultural identity, perceived heritage value, and emotional connection, rather than purely functional attributes. For example, research shows that cultural identity and perceived heritage value significantly affect tourists' behavioral intentions and engagement in sustainable tourism practices, highlighting the importance of aligning marketing strategies with cultural narratives and visitor values (Abdelghani et al., 2025). Furthermore, studies in sustainable tourism demonstrate that consumer behaviour is increasingly driven by environmental awareness, emotional value, and connectedness to nature, which act as key mechanisms in shaping responsible consumption and pro-environmental actions (Hu et al., 2026). In addition, the literature emphasizes that authenticity, visitor satisfaction, and destination image are central determinants that influence loyalty, revisit intention, and overall tourist experience in cultural heritage settings (J. Li et al., 2024). Overall, these findings indicate that consumer behavior in cultural heritage marketing is multidimensional, where cognitive, emotional, and cultural factors interact with sustainability values to shape tourists' decisions, loyalty, and long-term support for heritage destinations.

Sustainability in Cultural Heritage Tourism

Sustainability in cultural heritage marketing can be understood as the deliberate integration of environmental, social, and cultural preservation principles into tourism promotion to generate long-term value for both destinations and consumers. studies indicate that effective heritage marketing should extend beyond purely economic objectives by incorporating authentic storytelling, community involvement, and responsible communication practices to safeguard cultural identity while enriching visitor experiences. For example, (Medunjanin, Semija & Tahiri, 2025) highlight that cultural heritage marketing contributes to sustainable tourism when destination branding is aligned with local values,

social cohesion, and the continuity of cultural traditions. Likewise, sustainable tourism marketing has been found to shape tourists' pro-environmental behavior and consumption choices through mechanisms such as intrinsic motivation and environmental awareness (Zheng et al., 2025). In heritage tourism contexts, the use of digital storytelling and participatory communication further enhances sustainability by conveying deeper cultural meaning and encouraging responsible tourist engagement, which ultimately improves satisfaction and revisit intention. Overall, the literature suggests that sustainability in cultural heritage marketing is most impact when it combines authenticity, emotional value, and ethical consumption, thereby influencing customer behavior toward loyalty, environmental responsibility, and sustained support for destinations.

Technopreneurship in Cultural Heritage Tourism

Technopreneurship in cultural heritage tourism refers to the integration of digital innovation and entrepreneurial strategies to enhance the creation and sustainability of heritage-based tourism experiences. technopreneurship enables tourism stakeholders, especially SMEs and local communities, to adopt advanced technologies such as artificial intelligence, big data, and digital platforms to improve service personalization, operational efficiency, and visitor engagement. For instance, digital transformation initiatives in tourism organizations have been shown to strengthen innovation capacity and support business model development, ultimately enhancing value creation and competitiveness in tourism destinations (Santarsiero et al., 2024). Furthermore, the digitalization of cultural heritage resources increases accessibility, fosters participatory engagement, and strengthens the sociocultural value of destinations, thereby supporting long-term regional sustainability (Sandriester et al., 2025). In addition, digital marketing and platform-based innovation within technopreneurial ecosystems play an important role in shaping tourists' behavioral intentions, particularly when aligned with ethical and sustainability principles (Ahmad et al., 2025). Overall, the literature suggests that technopreneurship should not be viewed merely as technological adoption, but rather as a strategic mechanism that integrates innovation, sustainability, and customer-oriented value creation, ultimately influencing consumer behaviour through enhanced engagement, satisfaction, and loyalty.

Mechanisms Linking Sustainability, Technopreneurship, and Customer Behaviour

The relationship between sustainability, technopreneurship, and customer behavior in tourism can be explained through a set of psychological and experiential mechanisms that mediate how external strategies influence tourist responses. studies show that sustainability-oriented marketing does not directly drive behavior but operates through mediating variables such as emotional value, connectedness to nature, satisfaction, and personal norms. For instance, sustainable marketing practices have been empirically proven to influence tourists' pro-environmental behavior both directly and indirectly through emotional value and connectedness to nature, highlighting the importance of affective and cognitive pathways in shaping behavioral outcomes (Hu et al., 2026). Similarly, research in ecotourism demonstrates that tourist satisfaction and personal norms act as key mediators that transform experiential and environmental perceptions into responsible post-visit behavior, reinforcing the role of psychological processes in sustainability-driven consumption (Balaskas et al., 2025). These findings indicate that sustainability becomes more effective when it is embedded in meaningful experiences that align with tourists' internal values rather than being communicated as purely informational content. In addition, technopreneursip enhances these mechanisms by enabling interactive, personalized, and experience-based engagement through digital

platforms. Evidence from recent open-access studies shows that experiential value particularly emotional and social value plays a significant mediating role between tourism environments and behavioral outcomes such as loyalty, participation, and citizenship behavior (W. Q. Chen et al., 2025). Moreover, sustainability-related values, such as ecological awareness and green consumption orientation, also function as mediating and reinforcing factors that shape environmentally responsible behavior through layered (chain) mediation processes (Yizhan & Jiabao, 2026). This suggests that digital innovation and sustainability strategies are most effective when they foster co-creation, emotional engagement, and value-based experiences. Overall, the integration of sustainability and technopreneurship influences customer behavior through a complex system of mediators—particularly emotional value, perceived value, trust, and experiential engagement which ultimately determine tourists' loyalty, revisit intention, and responsible behavior.

3. Method

This research adopted a concept - centrist systematic literature review method. Following the development of a search protocol, the researchers conducted searches across information systems databases and other related disciplinary databases to retrieve and select relevant articles for review. The findings of the systematic review highlight multiple event dimensions, including opportunity discovery and selection, team formation and domain consensus, bootstrapping, minimum viable product development, and feedback from market experimentation, which are essential in the emergence of technology start-ups. However, earlier studies often address these events in isolation by concentrating on particular aspects. Based on this review, the authors developed a framework that integrates and aligns these various dimensions, this ensures greater rigor and to guide the literature search use the SPIDER Framework consist of S(Sample), PI (Phenomenon of Interest), D(Design), E (Evaluation), R (Research Type), These terms form the basis of the search strategy and will be further broadened by incorporating related keywords and synonyms to ensure comprehensive coverage of relevant studies across academic databases.

Table 1. SPIDER Framework

Element	Definition in Study
S (Sample)	(SMEs, technopreneurs), heritage tourism consumers
PI (Phenomenon of Interest)	Technopreneurship (digital adoption, innovation, platform use)
D (Design)	Empirical studies (survey, experiment, case study)
E (Evaluation)	Consumer response (trust, WTP, engagement, loyalty) and firm performance
R (Research type)	Quantitative

For this research the data utilized in this study are secondary, derived from scholarly research articles published in peer-reviewed online journals. These articles were collected through the Scopus database, which is widely acknowledged as a comprehensive and reputable academic search platform. To ensure a systematic and targeted retrieval of relevant literature, keyword combinations were developed using Boolean operators (AND, OR) to improve both accuracy and coverage, enabling the identification of studies that broadly yet specifically explore the intersection between artificial intelligence and management-related fields.

After gathering data from Scopus, the researchers applied the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach, which is carried out in three main stages (see Figure).

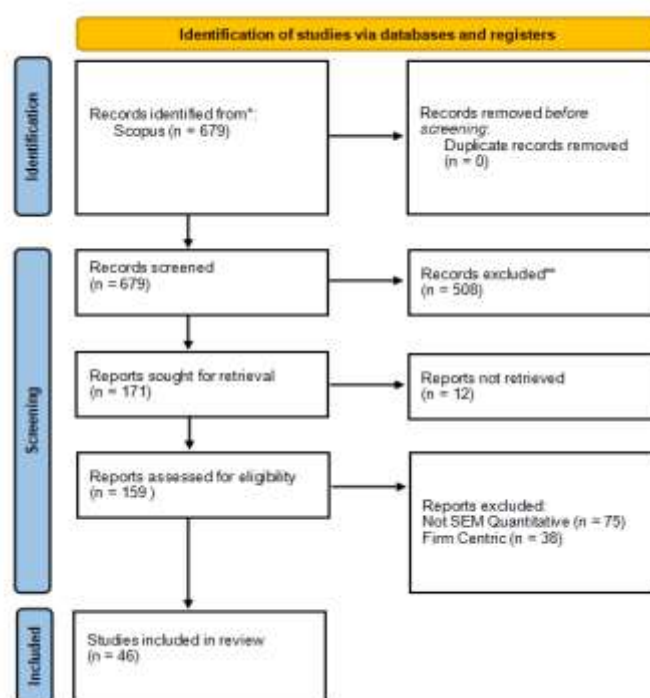


Figure 4: PRISMA Flow Diagram

4. Results And Discussion

This section presents the results of a systematic literature review based on 46 selected papers, categorized according to their research design and methods. The analysis of these studies aims to identify overarching research trends within the field. Furthermore, a network analysis was conducted using the co-occurrence of keywords and abstracts. Through knowledge domain visualization, the study is able to reveal the intellectual connections and structural organization among the existing body of research.

RQ1: How has the literature on sustainability marketing, technopreneur tourism, heritage tourism, and customer behavior evolved in recent years?

The synthesis of RQ1, based on the analyzed dataset (N = 46), provides a systematic and quantitative overview of the characteristics and development of research in technopreneurship and tourism. The temporal distribution of publications shows a clear upward trend, with a substantial increase in recent years. Notably, more than half of the studies were published in 2025 (52.2%), indicating a significant surge in academic interest. In contrast, earlier years such as 2020, 2021, and 2022 contributed relatively fewer publications, suggesting that this field is still in its early stages but

experiencing rapid growth. This pattern reflects the increasing relevance of digital transformation and technopreneurship in tourism, particularly in the post-pandemic era. Overall, the findings highlight that this research domain is emerging yet expanding at an accelerated pace, driven by the growing importance of digital innovation in shaping tourism practices and consumer behavior, can be explained in the following.

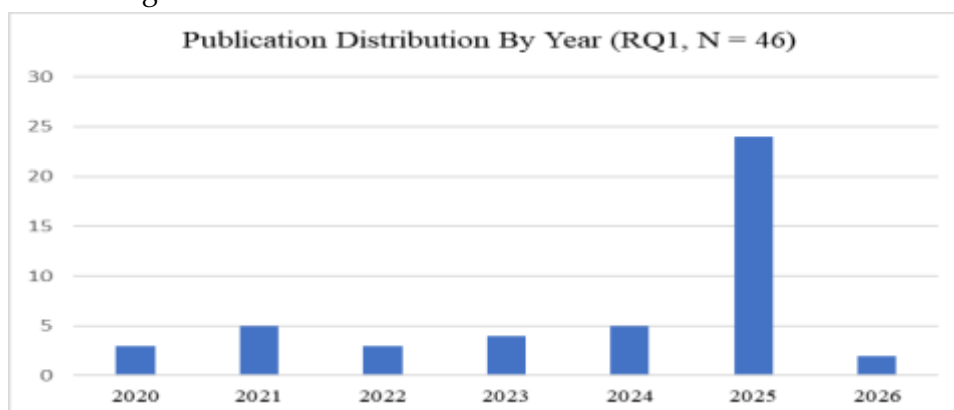


Figure 5. Publicaion Distribution by Year (RQ1, N = 46)

The sharp increase in publications after 2020—especially the peak in 2025—confirms that technopreneurship in tourism is a rapidly growing research area with strong momentum in the post-COVID period. The temporal distribution of the selected studies indicates a notable increase in research output in recent years, with a substantial proportion of publications concentrated in 2025 (52.2%). This upward trend reflects the growing significance of digital transformation and entrepreneurship within the tourism sector, particularly in the post-pandemic context. In contrast, earlier studies published between 2020 and 2022 remain relatively limited, suggesting that this field is still in its developmental stage but is expanding at a rapid pace. In terms of research context, the findings reveal a strong dominance of studies conducted within general tourism, hospitality, and destination settings, accounting for 91.3% of the total sample. Conversely, only a small proportion of studies specifically address cultural or heritage tourism (4.3%), as well as digital economy or non-tourism contexts (4.3%). This distribution indicates that although digital transformation has been widely explored in mainstream tourism services, its application in heritage-based sectors and traditional industries remains significantly under-examined. Overall, these results highlight that the field is both emerging and rapidly growing, with particularly strong research momentum following the COVID-19 pandemic, while also revealing critical gaps in heritage-focused research, can be illustrated in the figure below

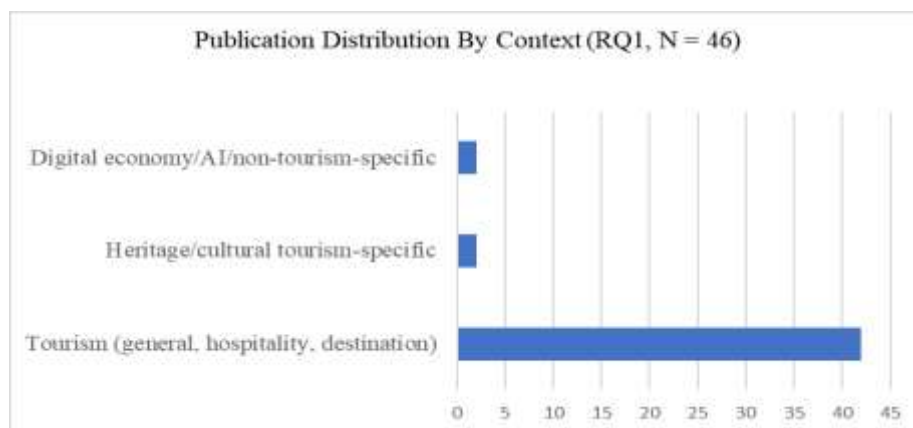


Figure 6. Publication Distribution by Context (RQ1, N = 46)

A critical insight emerging from the analysis is the presence of a substantial research gap within the existing literature. Current studies are overwhelmingly concentrated in general tourism contexts, while heritage-based products—such as traditional crafts, batik, and handicrafts—receive minimal scholarly attention. This imbalance indicates that the application of digital transformation and technopreneurship in heritage sectors remains largely under explored. Consequently, this gap provides a strong justification for the present systematic literature review, positioning it as a novel contribution with significant theoretical and practical relevance.

The methodological landscape of the reviewed studies is predominantly characterized by a strong reliance on quantitative approaches, which account for 91.3% of the total sample. In contrast, mixed-method and qualitative studies are considerably underrepresented, comprising only 6.5% and 2.2%, respectively. Most of the existing research employs survey-based designs supported by advanced statistical techniques, particularly structural equation modeling, to test hypothesized relationships. This pattern reflects a clear emphasis on quantitative validation and theory testing, while offering limited exploration of deeper contextual, experiential, and process-oriented insights that are typically captured through qualitative approaches. Based on the graph below



Figure 7. Publication Distribution by Methods (RQ1, N = 46)

The existing literature demonstrates a significant methodological imbalance, with a strong tendency to rely on dominant research approaches while under utilizing alternative perspectives. This creates a critical gap in understanding, particularly in areas that require deeper contextual insight, qualitative exploration, and process-oriented analysis. As a result, many studies fail to capture the complexity and dynamics of real-world phenomena, limiting the richness and applicability of their findings. Addressing this imbalance by incorporating more contextualized, qualitative, and process-

based approaches would provide a more comprehensive and nuanced understanding of the subject matter. The results show that social media marketing represents the most prevalent form of digital transformation, accounting for 60.9%, followed by e-commerce and online platforms at 17.4%. In contrast, more advanced technologies such as artificial intelligence, virtual reality, and smart tourism systems receive considerably less attention. This pattern indicates that current research tends to emphasize practical, operational digital tools rather than focusing on the development of strategic technopreneurial capabilities.

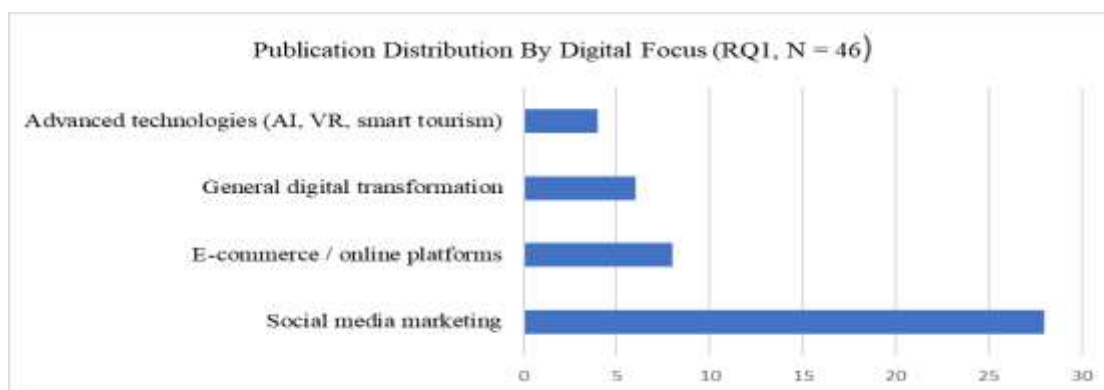


Figure 8. Publicaion Distribution by Digital Focus (RQ1, N = 46)

The current body of literature reveals a strong emphasis on the use of digital tools, particularly social media, as the primary lens for understanding digital transformation in tourism. However, it pays relatively little attention to the development of deeper capabilities, such as technopreneurship, which reflects a significant theoretical gap. This imbalance suggests that while existing studies capture the functional use of technology, they often overlook the strategic and capability-driven aspects that underpin long-term innovation and competitiveness. Overall, the literature on digital transformation and technopreneurship in tourism is characterized by three dominant patterns: a strong concentration on tourism-related contexts, a heavy reliance on quantitative research methods, and a primary focus on social media-based digital tools. The notable surge in publications after 2020, particularly toward 2025, indicates the increasing relevance of digitization in the post-pandemic landscape. Nevertheless, the limited exploration of heritage-based tourism products and the minimal attention given to advanced technologies—such as artificial intelligence and smart systems—point to important gaps in current research. In addition, the predominance of quantitative approaches reflects a lack of deeper, context-sensitive, and process-oriented insights into technopreneurship. The findings of RQ1 indicate a clear pattern in the development of the literature. There has been a rapid and significant increase in publications after 2020, reaching a peak in 2025. In terms of context, the studies are overwhelmingly concentrated within the tourism sector, accounting for approximately 91% of the literature. Methodologically, the field is strongly dominated by quantitative approaches, also representing around 91%. Furthermore, the focus of digital transformation is largely centered on social media, which constitutes about 61% of the studies.

RQ2: What key antecedents drive customer behavior in heritage tourism under sustainability-oriented and digitally enabled marketing conditions?

The analysis of RQ2 reveals that the literature identifies five major categories of factors driving technopreneurship: technological factors, content and communication factors, social interaction factors, psychological factors, and organizational factors(Xie et al., 2022). Among these, social interaction factors such as electronic word-of-mouth, engagement, and social media usage emerge as the most dominant, indicating that technopreneurship is largely conceptualized as a communication-driven activity(Borrego-Baslalobre et al., 2024). Content-related factors, including user-generated content and influence marketing, also play a significant role in shaping consumer perceptions and behaviors. Meanwhile, psychological variables, particularly trust, consistently appear as key mechanisms influencing outcomes. In contrast, technological and organizational factors receive relatively limited attention, highlighting a lack of focus on strategic capabilities and internal resources within the existing body of research (Skandalis & Skandali, 2025).

This suggests that current studies tend to frame technopreneurship primarily through the lens of social interaction and digital content, rather than as a comprehensive, capability-based construct. Social media-driven engagement and communication dominate the discourse, while deeper technological aspects such as system performance and innovation and organizational capabilities such as infrastructure and strategic orientation remain under-explored(Del Vecchio et al., 2025). Consequently, this imbalance points to a significant theoretical gap, where technopreneurship is reduced to operational digital activities instead of being understood as a broader strategic capability that integrates technology, resources, and long-term innovation(Del Vecchio et al., 2025).

RQ3: Through what mediating mechanisms do sustainability marketing and technopreneurial digital interactions influence outcomes such as revisit intention, loyalty, recommendation, and responsible behavior?

The findings of RQ3 demonstrate that technopreneurship influences consumer behavior through a structured and multi-layered process. The outcomes identified in the literature can be broadly categorized into behavioral, psychological, engagement, and firm-level outcomes(L. Li & Guan, 2025a). Among these, behavioral outcomes such as purchase intention, visit intention, and revisit intention are the most dominant, appearing in the majority of studies. Psychological outcomes, particularly trust, satisfaction, and perceived value, serve as a core layer that mediates consumer responses(M. Li & Gao, 2024). Additionally, engagement and experiential outcomes such as interaction, participation, and immersive experiences play an important role in shaping consumer perceptions, while firm-level outcomes receive comparatively limited attention. Overall, the literature remains highly consumer-centrist, focusing primarily on intentions and perceptions rather than long-term organizational performance. Furthermore, the relationship mapping reveals a consistent pattern across studies. Digital tools such as social media, content, and digital platforms first enhance engagement and interaction, which then influence psychological states like trust and satisfaction. These psychological factors subsequently drive behavioral outcomes, including purchase and revisit intentions. Direct effects of digital tools on behavior exist but are less prominent. This suggests a dominant sequential process in which digital transformation operates through intermediate mechanisms rather than producing immediate behavioral change(Del Vecchio et al., 2025).

More importantly, the analysis identifies several key mechanisms underlying this process. Mediation emerges as the most dominant mechanism, where trust, perceived value, and satisfaction act as central mediators. Engagement-based mechanisms highlight the role of interaction and

participation as entry points, while experience-based mechanisms emphasize the importance of immersive technologies in shaping emotional responses. In more advanced models, a multi-stage mechanism is observed, linking digital engagement, trust formation, and behavioral outcomes in a continuous process. These findings collectively indicate that technopreneurship does not directly influence consumer behavior but operates through a chain of engagement and psychological transformation. This overall pattern aligns closely with the Stimulus–Organism–Response (S-O-R) framework, where digital tools function as stimuli, psychological states act as internal processes, and behavioral intentions represent the final response. (Rivaldy et al., 2025)

RQ4: What conceptual, contextual, and methodological gaps remain for future research, particularly in heritage destinations shaped by SMEs, tourism villages, and community-based enterprises?

The proposed integrative framework conceptualizes technopreneurship as a multi-stage value creation process driven by social interaction, content, and digital technologies, and mediated by engagement, trust, and perceived value before shaping consumer behavior. However, when applied to heritage destinations particularly those dominated by SMEs, tourism villages, and community-based enterprises—it reveals several critical conceptual, contextual, and methodological gaps that warrant further investigation.

From a conceptual standpoint, existing studies largely frame technopreneurship as the use of digital tools, especially social media, rather than as a strategic capability embedded within organizations. This narrow perspective overlooks the importance of internal resources, local knowledge, and capability development, which are essential in heritage contexts where small-scale enterprises operate under constraints. Although trust and perceived value are consistently identified as key mechanisms, there is limited integration of capability-based theories, such as the resource-based view, to explain how these actors build and sustain technopreneurial practices (Dingzhao & maruf, 2025). From a contextual perspective, the literature is heavily concentrated on general tourism settings, with insufficient attention given to the distinct characteristics of heritage destinations. Factors such as cultural authenticity, community values, and local identity—highlighted as moderators in the framework—remain under-explored. In tourism villages and community-based enterprises, digital transformation extends beyond marketing functions and intersects with broader issues such as cultural preservation, social cohesion, and sustainable development. This indicates a gap in understanding how technopreneurship operates within community-driven and culturally embedded environments (S. Chen et al., 2025). From a methodological perspective, prior research is dominated by quantitative approaches that focus on behavioral intentions using established models such as TAM, UTAUT, and S-O-R. While the framework identifies complex, multi-stage mechanisms involving engagement and psychological processes, there is a lack of qualitative, longitudinal, and process-oriented studies that capture how these dynamics unfold over time. This limitation is particularly significant in SMEs and tourism villages, where technopreneurship develops through iterative learning, experimentation, and social interaction (L. Li & Guan, 2025b).

Overall, although the framework advances the understanding of technopreneurship as a value creation system, it also highlights key research gaps: the need to shift from tool-based to capability-based conceptualizations, the importance of incorporating heritage-specific and community-based contexts, and the necessity of adopting more diverse and process-oriented methodological

approaches. These gaps offer valuable directions for future research, particularly in exploring how technopreneurship can be effectively developed and sustained within SMEs, tourism villages, and community-based heritage settings.

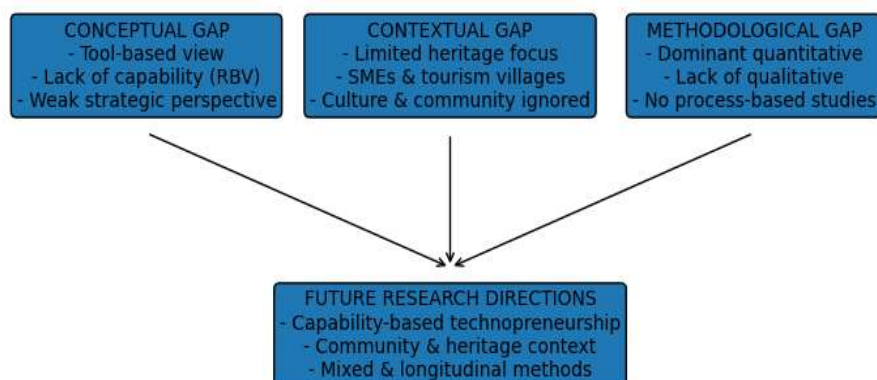


Figure 9. Research Gaps in Technopreneurship For Culture Heritage Tourism

The framework identifies three critical shortcomings in existing technopreneurship research, particularly within heritage tourism environments shaped by SMEs and community-based enterprises. It reveals that current studies are conceptually limited by focusing on digital tools rather than strategic capabilities, contextually constrained by a lack of attention to culturally embedded and community-driven destinations, and methodologically imbalanced due to an overreliance on quantitative approaches (Kerdpitak et al., 2022). Together, these limitations suggest the need for future research to adopt a more capability-oriented perspective, incorporate the unique characteristics of heritage contexts, and employ more diverse, qualitative, and process-based research designs.

5. Conclusion

This study demonstrates that technopreneurship and sustainability in cultural heritage tourism should be conceptualized as an integrated strategic capability rather than as distinct domains. Through this integration, destinations and tourism-related SMEs are able to leverage digital technologies to deliver experiences that are not only innovative but also authentic, meaningful, and aligned with sustainability principles. The findings indicate that tourist behavior in heritage contexts is not primarily driven by direct digital interaction; instead, it is mediated by key psychological and experiential factors, including perceived value, satisfaction, authenticity, emotional engagement, and place attachment. These mediating variables play a crucial role in shaping behavioral outcomes such as revisit intention, loyalty, word-of-mouth recommendation, and environmentally responsible actions. In addition, the study underscores the critical role of storytelling and authentic heritage interpretation in fostering emotional resonance and facilitating value co-creation between tourists and destinations. Digital transformation is shown to have more impact when it supports organizational adaptability, enhances customer value, and effectively communicates sustainability, rather than functioning solely as a promotional tool. Therefore, future research should move beyond the dominant focus on general tourism contexts and instead prioritize heritage tourism settings, particularly those driven by SMEs, local communities, and tourism villages, especially within developing and emerging regions.

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