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Digital capabilities in tourism entrepreneurship: a Bibliometric Literature Review

Abstract

Research background and purpose: This Bibliometric Literature Review examines the changing trends in academic research on tourism entrepreneurship over the last twenty-five years. This study examines the role of digital capabilities being studied in reference to entrepreneurial activities in the tourism sector.

Design/methodology/approach: Relevant data has been extracted from the Scopus database. PRISMA flow diagram helps us to identify, screen and choose the most relevant publications from the Scopus database for a rigorous technical methodology. Further, with the help of software tools like VOSviewer, the extracted data were visualised and analysed under Bibliometric Literature Review. Performance Analysis, Science Mapping, and Thematic clustering have been conducted for a comprehensive review of the literature to gain a deeper understanding of the work done so far.

Findings: The bibliometric study showed 384 relevant publications that were produced by 160 researchers from 84 different countries, demonstrating the wide interest in the topic. Further, with the help of VOSviewer software, the authors could compute synthesised performance analysis, science mapping, and thematic clustering. The key findings emphasise the most important authors, citations, and publications which have contributed a lot to the literature of digital capabilities in tourism entrepreneurship. There are four principal thematic clusters identified through this study.

Value added and limitations: This study, being one of its kind, identifies key research areas, influential works, and emerging trends while revealing critical knowledge gaps and understudied topics, guiding future research and strategic development of digital capabilities in tourism entrepreneurship. However, since the literature was extracted from the Scopus database, there is a further possibility to access other databases like Web of Science, Dimensions, and Google Scholar.

Keywords: *tourism entrepreneurship, digital capabilities, PRISMA model, bibliometric analysis, thematic clustering*

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1. Introduction

The tourism sector offers exciting opportunities for entrepreneurs looking to explore specialised niches, becoming one of the most dynamic components of the global service economy. Digital transformation in the tourism sector is increasing in the form of artificial intelligence (AI), big data analytics, cloud computing, digital platforms and smart tourism technology. They have led to a complete rethinking of the ways tourism products are developed, marketed, delivered and consumed and have forced the tourism entrepreneur to reinvent to meet ever-changing market demands (Demir & Demir, 2025; Wang, 2026). Digital technologies have proven essential to improving business resilience, operational efficiency, customer engagement, and sustainable competitiveness, especially since the onset of COVID-19 for tourist enterprises (Ribeiro-Soriano & Palacios-Marqués, 2024).

Tourism entrepreneurs are often working in a digitally connected world where their entrepreneurial success relies on their capacity to identify opportunities, to create innovative business models and to act proactively in the fast-changing technological and market conditions (Fernandes, 2021). In tourism research, the concepts of digital transformation and digital capabilities are often used interchangeably, but they are conceptually different. Digital transformation is the broad and total process by which companies make fundamental adjustments to their business models, processes, consumer relationships and value-creation due to the use of digital technologies (Kritikos et al., 2025). Digital capabilities, on the other hand, are the organisational skills, assets, information and flexible skills needed to successfully put into practice and manage digital transformation projects (Alhomaïd & Al-Romeedy, 2026). These include digital innovation capabilities, data analytics capabilities, AI capabilities, platform integration capabilities, digital learning capabilities, and technological adaptability, enabling organisations to continually sense opportunities, adapt and integrate technological resources, and reconfigure processes as market conditions evolve. Thus, digital capabilities are the dynamic capabilities underpinning the successful digital transformation, rather than its direct product.

Previous research has focused on various topics, including digital innovation, smart tourism, platform economy, entrepreneurial ecosystems, technology use, digital marketing, and technology for customer experience. Over the last decade, there has been an increase in the number of tourism entrepreneurship studies acknowledging the importance of digital skills on the competitiveness of tourism entrepreneurs, organisational resilience, sustainable tourism, destination development and creation of added value for customers. Even so, the existing literature is fragmented and is often presented from several disciplinary viewpoints, theoretical bases and technological backgrounds, so as not to develop an integrated understanding of this field.

Previous review studies have mainly been conducted on tourism entrepreneurship, digital transformation, technology adoption, or smart tourism as a separate field of study (Ivasciuc et al., 2024; López-Cabarcos et al., 2026). These studies give insight into technological developments or entrepreneurial practices, but not in the evolution of the conceptualisation of research aspects related to digital capabilities and tourism entrepreneurship over time. Furthermore, no comprehensive bibliometric synthesis exists that allows an overview of the intellectual structure, conceptual development, collaborative networks, prominent actors, thematic development, and new research trends in this rapidly growing interdisciplinary research field. As a result, researchers do not have a comprehensive understanding of the body of knowledge that informs digital competencies in tourism entrepreneurship and its theoretical directions for future research.

Research problem: Although the tourism sector is already a research field of growing interest in digital transformation, the existing literature is still fragmented and lacks a clear picture of the conceptual structure of tourism, influential knowledge domains, thematic evolution, and future research priorities.

The *research objectives* of this study are to systematically trace the intellectual structure, conceptual evolution, influential publications, collaborative networks, thematic development and future research directions of digital capabilities in tourism entrepreneurship. The study aims to enhance the theoretical development of this dynamic research field by combining performance analysis with science mapping techniques.

The research questions are as follows:

- RQ1: Which authors have prominently contributed to the research on digital capabilities in tourism entrepreneurship?*
- RQ2: Which journals have prominently contributed to the research on digital capabilities in tourism entrepreneurship?*
- RQ3: Which countries have prominently contributed to the research on digital capabilities in tourism entrepreneurship?*
- RQ4: How are scholarly collaboration networks structured within digital capabilities research in tourism entrepreneurship?*
- RQ5: What are the emerging research themes shaping the evolution of digital capabilities within tourism entrepreneurship?*
- RQ6: How is the co-occurrence of keywords related to digital capabilities, tourism, and entrepreneurship?*
- RQ7: What knowledge gaps and future research opportunities exist in the current literature?*
- RQ8: What are the current research trends globally applicable to digital capabilities in tourism entrepreneurship?*

The remaining structural flow of this paper is as follows. Section 2 reviews the related literature while section 3 outlines the research methods and Section 4 presents the results of the bibliometric analysis. Section 5 is about interpretation of findings and results followed by section 6 as conclusion and section 7 as limitations and future research scope.

2. Literature review

2.1. Tourism entrepreneurship

Tourism entrepreneurship refers to an interdisciplinary domain that combines the principles of entrepreneurship domain, emphasise innovation, opportunity recognition, and creating value in diverse tourism contexts (Wang et al., 2020). This emerging field has gained significant researchers' attention due to its potential to drive economic growth, enable sustainable development, and enhance competitiveness in tourism destinations (Ateljevic & Li, 2009). Online travel agencies, social media, AI-powered customer engagement and data-driven decision-making are changing entrepreneurial processes and routines in tourism destinations, offering new opportunities for innovation and, in turn, intensifying competitive pressures (Hernández-White et al., 2024; Pedraza-Rodríguez et al., 2026; Sapu et al., 2024; Sharma et al., 2024). Recent research has shown that digitally competent tourism companies have been more resilient, adaptable, and innovative in their performance, emphasising the need to build organisational capabilities instead of simply investing in digital technologies (Evinita et al., 2025; Moyano-Castolo et al., 2024; Neumann & Mason, 2023; Žebryté et al., 2019). The scope of research in tourism entrepreneurship is promising as it contributes to the local economy by empowering the locals, diversifying tourism products, and building resilience against market fluctuations (Czernek-Marszałek et al., 2024). This multi-directional approach positions tourism entrepreneurship as a critical area for future research, with policy implications, management and sustainability in tourism development (Chhabra et al., 2025; Manalu et al., 2024; Prodromou et al., 2025). Three prominent tenets – sensing, seizing, and reconfiguring- of the Dynamic Capabilities Theory (Teece, 2007, 2016) have helped underpin the phenomenon of implementing digital capabilities among various businesses by tourism entrepreneurs.

2.2. Digital capabilities of tourism entrepreneurs

In tourism research, the concepts of digital transformation and digital capabilities are often used interchangeably, but they are conceptually different. Digital transformation is the broad and total process by which companies make fundamental adjustments to their business models, processes, consumer relationships and value-creation due to the

use of digital technologies (Kritikos et al., 2025; Tran & Thi Van Hanh, 2025). Digital capabilities, on the other hand, are the organisational skills, assets, information, and flexible skills required to implement, practice, and manage digital transformation projects. Digital capabilities can be better understood as digital literacy and digital fluency (Kim & Jin, 2024). These include digital innovation capabilities, data analytics capabilities, AI capabilities, platform integration capabilities, digital learning capabilities, and technological adaptability, enabling organisations to continually sense opportunities, adapt, and integrate technological resources as market conditions evolve. Thus, digital capabilities are the strategic mechanisms underpinning the successful digital transformation, rather than its direct product. The disparity between usage and implementation of digital capabilities underscores the importance of examining how individual entrepreneurs develop and utilise digital capabilities to navigate the rapidly evolving tourism ecosystem, making it a crucial frontier for future research.

2.3. Bibliometric analysis

Being a quantitative approach, bibliometric analysis helps to evaluate and monitor the evolution of a research field by systematically analysing, publications, including citations, authorship, affiliations, keywords, themes, and methodologies, and trends towards statistical techniques (Hulland, 2024; Öztürk et al., 2024; Vogel & Güttel, 2013). Bibliometric literature reviews combine quantitative bibliometric techniques with systematic review protocols (PRISMA) to map the intellectual, social, and conceptual structures of a research field (Donthu et al., 2021), digital capabilities in tourism entrepreneurship in the current study. This method enables analysing large datasets, researching evolution, and revealing thematic clusters, and relationships among others' papers and keywords (Ellegaard & Wallin, 2015; Osareh, 1996). Unlike traditional qualitative reviews, bibliometric literature review offers objectivity and scalability, minimising interpretation bias while giving insights into the field dynamics of tourism entrepreneurship. It complements other review methods by identifying knowledge gaps, emerging trends, and potential contributions, establishing a robust foundation for future research. This process typically involves defining aims, data collection, analysis and visualisation, and result interpretation.

3. Methods

A systematic review in any specific field can be based on framework-based reviews (Dixon-Woods, 2011; Paul et al., 2024), meta-analyses (Field & Gillett, 2010; Guzzo et al., 1987), and bibliometric reviews (Donthu et al., 2021; Randhawa et al., 2016). Considering the fragmentary nature of tourism entrepreneurship research, highlighted

in the existing publications, a bibliometric systematic literature review (B-SLR) was conducted to synthesise the knowledge and uncover research gaps. PRISMA flow diagram (see Fig. 1) depicts the detailed process of identifying, screening and including the relevant publications from the database of Scopus. Scopus was selected because it covers high-quality peer-reviewed journals, offers standardised metadata, also due to high compatibility with VOSviewer with rigorous indexing, and is widely recommended in bibliometric research (Donthu et al., 2021; Hulland, 2024). Though the exclusive use of data from Scopus may omit studies indexed in other databases and is acknowledged by the authors as a limitation. The downloaded file had almost 874 publications from the years 2000 to 2026. All the possible synonyms of the main keywords were considered in the search string. The main subject areas considered for the study were Management, Business, and Accounting and Social Sciences (n=629). Only the research and conference articles (n=419) were selected for the study, as the remaining document types were not directly relevant to the domain studied. Moreover, the authors decided to consider only those articles which were published in the English language (n=399), the remaining languages needed additional translations and were time consuming process. Finally, a few more published articles were excluded (after reading the titles and their abstracts) from the datasheet to derive the most relevant documents (n=384) for the study.

Therefore, the publications included for the final study (n=384) were derived from the database after applying filters for subject areas, document types, and language of publications. Utmost care was taken to include all the publications with keywords like the main keywords for the study (“tourism”, “entrepreneurship”, and “digital capabilities”). The extracted CSV file was downloaded from the Scopus database and further uploaded on respective software for further bibliometric analysis.

SAAS workflow (Aria et al., 2026) (Search-Appraisal-Analysis-Synthesis) has been followed to conduct the current study. The process has been illustrated as follows:

- Search: Data collection is done from the Scopus database.
- Appraisal: Quality Assessment is ensured by filtering data and keeping a close check on quality control.
- Analysis: Deep investigation has been conducted, including Performance Analysis (Citations-and-Publications Analysis, Contribution of authors and countries Analysis), Science Mapping (Co-citation Analysis, Bibliographic Coupling, Co-word Analysis), Network Analysis (Co-occurrence Network), and Visualisation (Thematic Map).
- Synthesis: Results are reported in narrative and visualized format in their respective subsections.

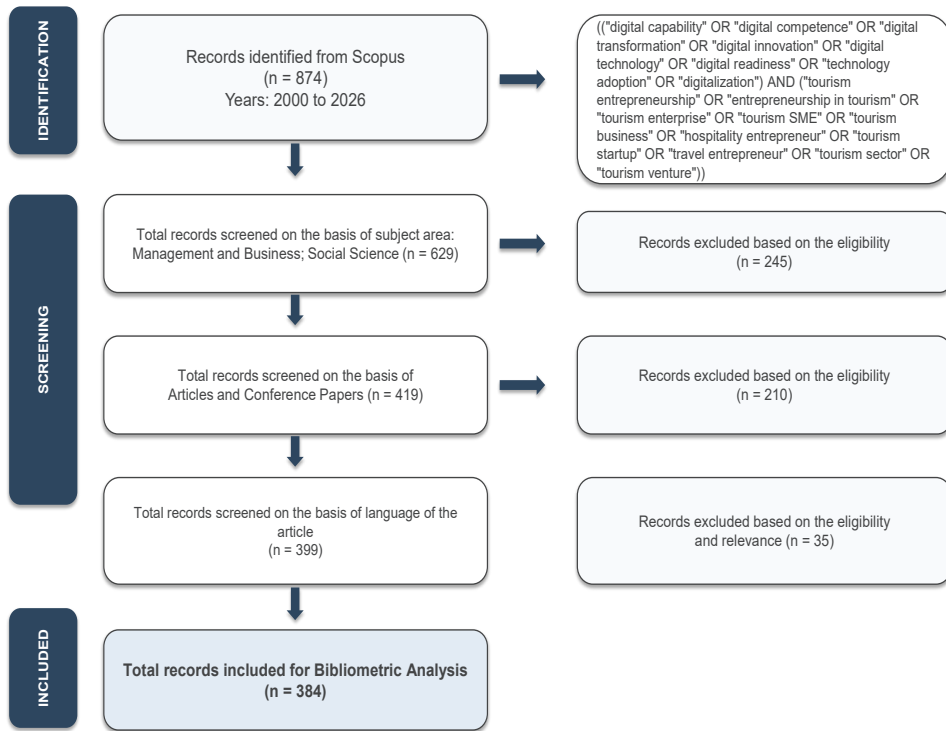


Figure 1. Preferred reporting items for systematic reviews and meta-analyses (PRISMA) flow diagram

Source: own study

The data is selected from the pioneer publication in the field of digital capabilities in tourism entrepreneurship. The time period from 2000 to 2026 has been considered for the study. There were no exclusions based on the year of publication. The data was downloaded from Scopus on 16th June 2026.

Synonyms for keywords like “digital capabilities”, “tourism”, and “entrepreneurship” were used to extract the most relevant publications from the Scopus database. Utmost care was taken with Boolean operators and quotation marks, just to ensure inclusion of every similar keyword for the study. The following key string was used for the search (“digital capability” OR “digital competence” OR “digital transformation” OR “digital innovation” OR “digital technology” OR “digital readiness” OR “technology adoption” OR “digitalization”) AND (“tourism entrepreneurship” OR “entrepreneurship in tourism” OR “tourism enterprise” OR “tourism SME” OR “tourism business” OR “hospitality entrepreneur” OR “tourism startup” OR “travel entrepreneur” OR “tourism sector” OR “tourism venture”)

“OR” tourism enterprise*”OR” tourism SME*”OR” tourism business*”OR” hospitality entrepreneur*” OR “tourism startup*” OR “travel entrepreneur*” OR “tourism sector” OR “tourism venture”)).

The next selection criterion to strategically filter the available publications was that only those publications were included from the subject areas of “Business, Management and Accounting” and “Social Sciences”, as there were no relevant publications found under other subject areas. The publications included in the study were articles and conference papers. The document types included for the study are the journal and conference papers.

This section normally refers to the strategy for filtering the publications based on the most preferred language. The authors have selected only those publications which are published in “English” for the bibliometric analysis.

Microsoft Excel, and VOSviewer version 1.6.20 (Van Eck & Waltman, 2010) were used for the robust bibliometric analysis and to synthesise the available data through performance analysis, science mapping, and network analysis.

4. Results of the bibliometrics analysis

The study’s results after rigorous bibliometric analysis through performance analysis, science mapping, network analysis, and thematic clustering are depicted in the following sections.

4.1. Outlook and summary of Scopus data

A summary of Scopus data for bibliometric analysis is depicted in Table 1, detailing the number of publications between 2000 and 2026. There were around 399 publications derived from the applied search string. Further sorting based on subject areas and document type.

Table 1: **Summary of Scopus Data for Bibliometric Analysis on digital capabilities in tourism entrepreneurship**

Description	Results
Period	2000-2026
Publications	384
Total journal articles	353

Total authors	160
Total countries	84
Total keywords	160
Total source titles	160

Source: own study

4.2. Performance analysis

Performance analysis (Moral Muñoz et al., 2020; Narin & Hamilton, 1996) evaluates the productivity and impact of a research field through publication, citation, author, journal, and country metrics. It reveals the field's intellectual evolution, influential contributors, and dominant knowledge sources, offering insights into the maturity and development of the literature. This study depicts the analyses undertaken in the form of year-wise total publications, number of top contributing authors, outlook of highly prominent countries, and citation-and-publication-related metrics.

4.2.1. Publication-related metrics

Total publications from 2004 to 2026 can be seen in Figure 2 below. The data was selected from 2000, but since the first publication in the field of digital capabilities in tourism entrepreneurship was only published in 2004, the total publications can be effectively seen from 2004 to 2026. The data was downloaded from Scopus on 16th June 2026. As more publications are expected to be published in the current year, there will be a further increase in the number of publications in 2026. Due to time constraints, authors have considered publications only till the mentioned date. The bar graph below clearly illustrates that there is an upward trend in the total number of published articles every year, 2025 being the highest with 119 publications and only 1 publication every year from the years 2004-2016. The graph depicts that from the year 2017 onwards, there is a continuous increase in the number of total publications in the domain of digital capabilities in tourism entrepreneurship, which clearly hints at the wide scope of research to be conducted in future. The total publications in the years 2020, 2021 and 2022 were almost doubled from that of 2019. Similarly, 2023 shows 200% rise and the trend can be seen in the subsequent years thereafter.

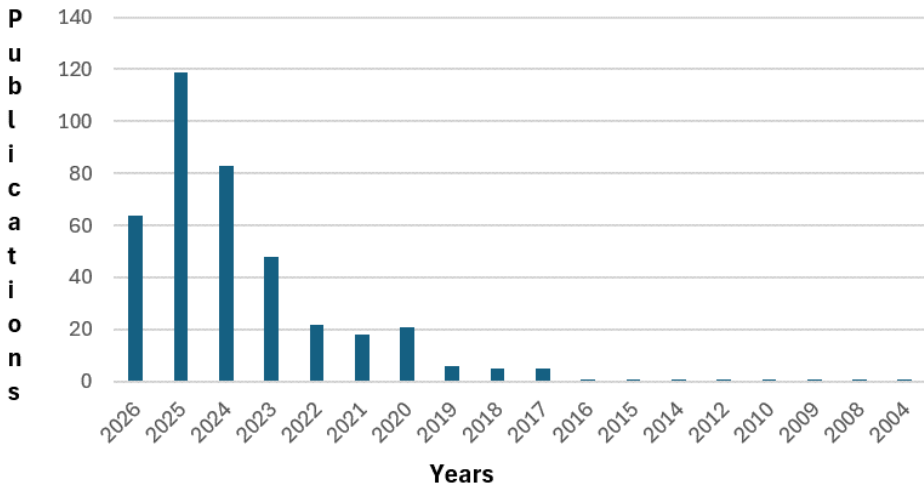


Figure 2. Year-wise total publications on digital capabilities in tourism entrepreneurship from 2000 to 2026

Source: own study

This subsection refers to the contributions by the top 10 authors (RQ1) out of the total authors ($n=84$), along with their total citations (see Table 2), followed by a map depicting countries (RQ3) (see Fig. 3), contributing to research in this field. The analysis of the most contributing authors reveals that research on digital capabilities in tourism entrepreneurship is led by a small group of authors who have made sustained contributions to the field. As shown in Table 2, Prados-Castillo, J.F. emerges as the most prolific author with 5 publications (Gálvez-Sánchez et al., 2026; Prados-Castillo et al., 2025, 2026; Prados-Castillo, Guaita Martínez, et al., 2023; Prados-Castillo, Torrecilla-García, et al., 2023) and 106 citations, indicating both high productivity and significant scholarly impact. Chiwaridzo O. T (Chiwaridzo, 2024; Chiwaridzo & Masengu, 2024, 2025b, 2025a) Halkiopoulou C. (Bakalis et al., 2024; Giakoumi & Halkiopoulou, 2024; Halkiopoulou et al., 2023; Theodorakopoulos et al., 2025), and Sifolo P.P.S. (Ndlovu et al., 2026; Sifolo, 2023, 2025; Sifolo et al., 2026), 4 publications each, collectively contributing to the advancement of knowledge on digital transformation, innovation, and technology adoption within tourism contexts. Authors such as Losada, N., Masengu, R., Melo, M., and Sousa, N. have each published 3 articles each (Chiwaridzo & Masengu, 2024, 2025b, 2025a; Sousa et al., 2023, 2023, 2024, 2025), demonstrating the growing diversity of contributors

engaged in this research area. Citation counts further indicate that productivity is often accompanied by academic influence, with several authors receiving substantial recognition for their research work from other researchers. There is a clear indication of more scholarly contributions in this field.

Table 2. **Top 10 authors who have contributed**

Author's Name	No. of Publications	Total Citations
Prados-Castillo, J.F.	5	106
Chiwaridzo, O.T.	4	25
Halkiopoulos, C.	4	48
Sifolo, P.P.S.	4	7
Losada, N.	3	51
Masengu, R.	3	22
Melo, M.	3	51
Sousa, N.	3	51
Alén, E.	2	21
Boiko, M.	2	36

Source: own study

From a geographical perspective (Table 3), followed by a Map (Fig. 3) below, highlights China as the leading contributor with 51 publications, followed by Spain (38), Indonesia (33), and Malaysia (27), the United Kingdom (24), and Portugal (23) also demonstrate strong research engagement, while India and Italy contribute 18 publications each. These findings suggest that research on digital capabilities in tourism entrepreneurship is geographically dispersed, with significant contributions from both developed and emerging economies, reflecting the global relevance of digital transformation within the tourism sector. Though a rigorous analysis requires more work in the emerging countries.

Table 3. **Outlook of highly Prominent Countries**

Countries	Publications	Countries	Publications	Countries	Publications
China	51	Netherlands	6	Hungary	2
Spain	38	Austria	5	Iraq	2
Indonesia	33	Hong Kong	5	Lebanon	2
Malaysia	27	Mexico	5	Mauritius	2
United Kingdom	24	Slovenia	5	Philippines	2
Portugal	23	Switzerland	5	Serbia	2
India	18	Taiwan	5	Undefined	2
Italy	18	Bangladesh	4	Argentina	1
Greece	17	Canada	4	Armenia	1
Russian Fed.	16	Colombia	4	Azerbaijan	1
Turkey	15	Ecuador	4	Bahrain	1
Viet Nam	13	Finland	4	Belarus	1
Ukraine	12	France	4	Belgium	1
United States	12	Japan	4	Brunei Darussalam	1
Australia	11	Jordan	4	Costa Rica	1
Saudi Arabia	11	Norway	4	Denmark	1
Thailand	11	Oman	4	Estonia	1
Poland	10	Peru	4	Iceland	1
Slovakia	9	United Arab Emirates	4	Iran	1
Germany	8	Albania	3	Kenya	1
South Africa	8	Lithuania	3	Kuwait	1
South Korea	8	Macao	3	Latvia	1
Croatia	7	Uzbekistan	3	Malta	1
Pakistan	7	Brazil	2	Singapore	1
Romania	7	Bulgaria	2	Sri Lanka	1
Cyprus	6	Chile	2	Sweden	1
Egypt	6	Czech Republic	2	Tanzania	1
Kazakhstan	6	Ghana	2	Uganda	1

Source: own study

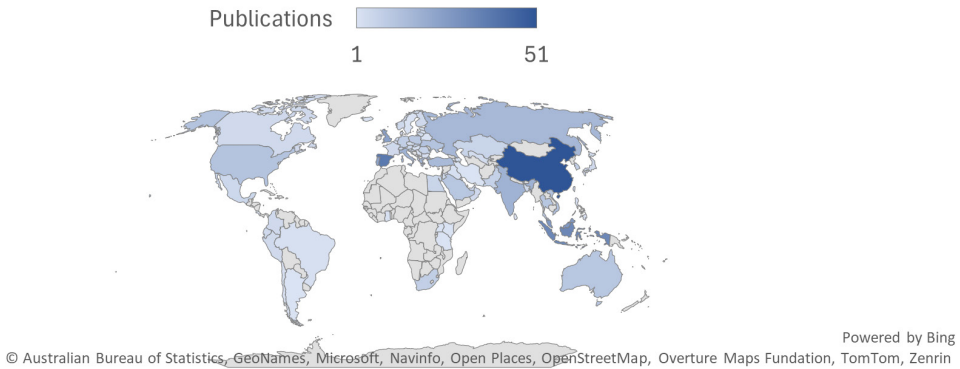


Figure 3. The map indicates the number of authors from a particular country. A darker shade indicates more authors from that country

Source: own study

4.2.2. Citation-and-publication-related metrics

Addressing RQ2, this subsection studied 384 publications, based on the total citations in this subsection, referring to the top 10 most influential research articles in the field of digital capabilities in tourism entrepreneurship. Out of these, 27 publications could meet the threshold of a minimum of 50 citations per publication. The same has been depicted in Table 4 below. These articles highlight the role of digital technologies in enhancing innovation, competitiveness, and value creation. Among the most cited studies, Guttentag (2010) established a foundational understanding of virtual reality applications in tourism, demonstrating its potential for destination marketing, planning and heritage preservation. Pencarelli et al. (2020) further conceptualised the digital revolution in tourism through the lens of Tourism 4.0, emphasising the integration of smart technologies and sustainability. Recent contributions have expanded the discourse towards immersive and intelligent technologies. Carlisle et al. (2023) drew attention to the digital skills divide within the tourism sector, identifying digital literacy and technological competencies as critical capabilities for entrepreneurial success. Collectively, these influential studies emphasise the growing importance of digital capabilities, including AI adoption, virtual reality, digital skills, and digital transformations in shaping the future of tourism entrepreneurship. The h-index of the journal in which the article is published reveals its productivity. Work by Pillai and Sivathanu (2020). The 'International Journal of Contemporary Hospitality Management' has the highest citations per year, though the journal's h-index is 86, wherein journal named 'Sustainability' of Switzerland (h-index = 207) has an average citation of

39. These two extreme examples demonstrate that the impact of individual publication is not solely determined by journal prestige. Rather, it reflects the article's strong conceptual contribution and the growing prominence of digital capabilities as a strategic research theme in tourism. Though we cannot neglect the fact that a higher h-index of journals signifies their broader and sustained influence across multiple research domains, with citations distributed across a larger volume of publications.

Table 4. Top 10 influential research articles based on the citation and publication matrix

Rank	Authors (Year)	Article title	Journal	Citations	Citations per year	H-index (h)
1	(Pillai & Sivathanu, 2020)	Adoption of AI-based chatbots for hospitality and tourism	International Journal of Contemporary Hospitality Management	892	127.43	86
2	(Pencarelli, 2020)	The digital revolution in the travel and tourism industry	Information Technology and Tourism	688	98.29	18
3	(Guttentag, 2010)	Virtual reality: Applications and implications for tourism	Tourism Management	1406	82.71	199
4	(Talwar et al., 2023)	Digitalisation and sustainability: virtual reality tourism in a post-pandemic world	Journal of Sustainable Tourism	257	64.25	150
5	(Mogaji et al., 2024)	Is it the end of the technology acceptance model in the era of generative artificial intelligence?	International Journal of Contemporary Hospitality Management	152	50.67	139
6	(Carlisle et al., 2023)	The digital skills divide: evidence from the European tourism industry	Journal of Tourism Futures	159	39.75	42
7	(Monaco & Sacchi, 2023)	Travelling the Metaverse: Potential Benefits and Main Challenges for Tourism Sectors and Research Applications	Sustainability (Switzerland)	158	39.50	207

8	(Shamim et al., 2025)	Evaluating user engagement via the Metaverse environment through immersive experience for travel and tourism websites	International Journal of Contemporary Hospitality Management	73	36.50	155
9	(Gutierriz et al., 2025)	Digital transformation and the new combinations in tourism: A systematic literature review	Tourism and Hospitality Research	6	34.5	64
10	(Haukeland et al., 2026)	Prospects for nature-based tourism: identifying trends with commercial potential	Journal of Ecotourism	34	34.0	56

Source: own study

4.3. Science mapping – how has the field evolved?

Science mapping (Chen, 2017; Hallinger & Kovačević, 2019; Kipper et al., 2020) systematically visualises the intellectual structure and development of a research field by analysing relationships among publications, authors, and concepts. In tourism entrepreneurship, science mapping reveals an evolving domain characterised by growing thematic diversity, increasing interdisciplinarity, and the emergence of digital transformation, sustainability and innovation as central research areas. This study conducts bibliographic coupling and co-word analysis under science mapping.

4.3.1.. Bibliographic coupling

Bibliographic coupling analyses the similarity between documents based on shared references, grouping them into clusters that reflect related research themes (Jarneving, 2007; Weinberg, 1974). This method helps identify intellectual linkages and emerging subfields within a domain, facilitating a better understanding of the field's structure and development. The minimum number of citations of a document is 10. Out of the total documents, 133 documents could meet the threshold. The authors in the current study have merged smaller clusters and maintained the minimum cluster size of 10. There are 6 clusters formed out of 125 items, 1183 links, and their total link strength is 1756. The thematic clusters formed from the present cited publications, allowing recent and niche

work to be visible, enable bibliographic coupling ideal for identifying current research themes and developments in the studied domain. Fig. 4 depicts the bibliographic coupling network, revealing six closely connected research clusters, with Guttentag (2010), Pencarelli (2020), and Pillai and Sivathanu (2020) and a few more, serving as the most influential nodes, further indicating their significant contribution in shaping contemporary research streams on digital capabilities, transformation, innovation, and technology adoption in tourism. Table 5 details the six clusters under different colour codes, representing various themes like ‘Tourism Development’, ‘Emerging Technology’, ‘Digital Transformation’, ‘Tourism Entrepreneurship’, ‘Advanced Technologies’, and ‘Smart Tourism’. Each cluster has a specific theme and colour code with its focus area and representative publications mentioned for a better understanding of the researchers in this field. Cluster 1, represented in red colour have themed as ‘Tourism Development’, which focuses on the digital revolution in the tourism sector and a few prominent authors like Alonso et al.(2024); Arcuri et al. (2020); Pencarelli (2020) have contributed to this research area. The colour-coded cluster formations signify that there is a wider scope of more publications in future, specifically the purple-, yellow- and sky-blue-coloured themes.

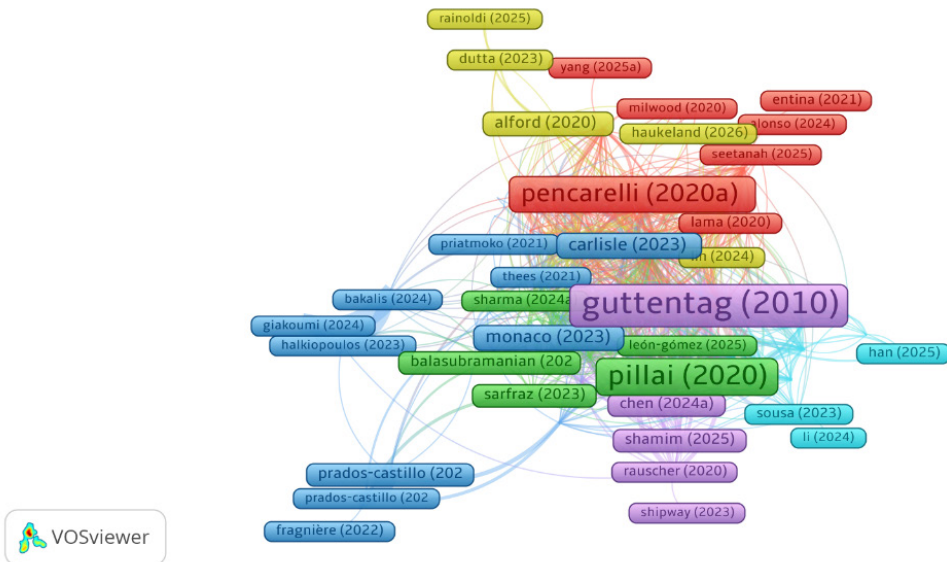


Figure 4. **Bibliographic coupling based on total documents using VOSviewer**

Source: own study

Table 5. Thematic clusters formed through bibliographic coupling

Clusters	Cluster colour	Theme – number of items	Representative documents	Key focus
Cluster 1	Red	Tourism Development – 14 items	Alonso et al.(2024); Arcuri et al. (2020); Pencarelli (2020)	Digital revolution
Cluster 2	Green	Emerging technologies – 13 items	Ammirato et al. (2022); Balasubramanian et al. (2022)	Blockchain, AI-based chatbots
Cluster 3	Navy Blue	Digital transformation – 12 items	Bilan et al. (2024); Bakalis et al., 2024)	Digitalisation, Sustainability
Cluster 4	Yellow	Tourism Entrepreneurship – 9 items	Sousa et al. (2025); Dutta et al.(2023); Alford and Jones (2020)	Metaverse and digitalisation in tourism entrepreneurship
Cluster 5	Purple	Advanced technologies – 8 items	Guttentag (2010); Shamim et al.(2025); Rauscher et al.(2020)	Augmented and Virtual Reality
Cluster 6	Sky-blue	Smart Tourism – 7 items	Sousa, Alén-González, et al.(2025); Liu et al. (2024); Brown & Kaewkitipong (2009)	E-tourism, AI in tourism

Source: own study

4.3.2. Co-word analysis

While the techniques conducted so far focus on relationships among publications, co-word analysis examines the actual content of publications by analysing keyword co-occurrences, thereby revealing major research themes, conceptual structures, and emerging trends within a field. The words in a co-word analysis are often derived from “author keywords”, “article titles”, “abstracts” or “full texts” for the analysis purpose. (Ding et al., 2001; Feng et al., 2017; Z.Y. Wang et al., 2012; Whittaker, 1989). Co-word analysis helps the researchers understand the existing and future relationships among topics and answer RQ4 of the study. There were about 1385 authors’ keywords. 39 met the threshold where a minimum of 5 occurrences of a keyword were considered for the analysis. Further, for each of 39 keywords, the total strength of the co-occurrence links with other keywords has been calculated through VOSviewer (see Fig. 5). The keywords with the greatest total link strength have been further selected for the analysis. To explain a few keywords further, ‘tourism’ is in cluster 2 (green), with 31 links (including entrepreneurship and digitalisation) and a total link strength of 98 and has 78 occurrences. Similarly, entrepreneurship falls under cluster 1 (red)

with 9 links (including tourism and digitalisation) and a total link strength of 12 and has 6 occurrences. Thus, there lies a wider scope of research work in future in cluster 1 with a lesser number of links at present. The co-word analysis using authors' keywords depicts the total number of existing publications and the future possibility of relationships among the unlinked keywords.

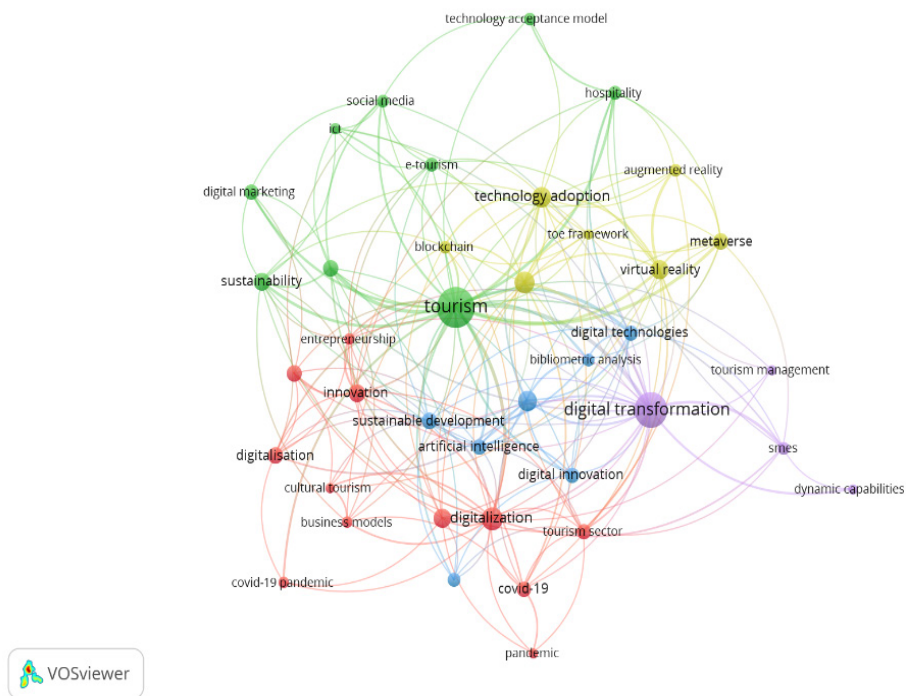


Figure 5. Co-word analysis from authors' keywords using VOSviewer

Source: own study

4.4. Clustering based on the co-occurrence network of authors' keywords

Table 6 depicts the PageRank-based keywords analysis based on the co-occurrence network of authors' keywords. It reveals three dominant research streams. The larger cluster (red) on 'tourism, digitalisation, and smart tourism' emphasises digital transformation and technology integration in the tourism sector. The second cluster

(blue) focuses on ‘technology adoption, digital innovation, and artificial intelligence as drivers of development in the tourism sector. The third cluster (green) highlights sustainability-oriented tourism, linking digitalisation with sustainable development, cluster heritage preservation, and immersive technologies such as virtual and augmented reality. Collectively, the findings indicate a shift toward digitally enabled, innovation-driven, and sustainable tourism ecosystems. Page-Rank analysis reveals tourism, technology adoption, and tourism development as the most influential keywords within the research network. Their high PageRank values indicate strong connectivity with other prominent keywords in the network, highlighting their central role as foundational papers in shaping the intellectual structure and future direction of tourism digitalisation research. The entrepreneurial domain in the tourism sector is still unexplored in terms of digitalisation, which can be further studied by scholars.

Furthermore, Fig.6 enables the researchers interested in this field to understand cluster formation through visualisation and answer RQ6 effectively.

Table 6. **Clustering based on co-occurrences network of authors' keywords.**

Cluster 1 - Tourism, Smart tourism, Digitalisation (Red)		Cluster 2 - Technology adoption and digital innovation (Blue)		Cluster 3 - Sustainability in the tourism business (Green)	
Keywords	PageRank	Keywords	PageRank	Keywords	PageRank
tourism	0.116	technology adoption	0.055	Sustainability	0.039
digital transformation	0.032	tourism development	0.054	covid-19	0.026
digitalization	0.012	innovation	0.038	sustainable development	0.027
smart tourism	0.014	marketing	0.039	virtual reality	0.029
tourism industry	0.017	tourism management	0.028	sustainable tourism	0.017
digital technologies	0.022	ecotourism	0.031	Digitization	0.034
China	0.018	tourism market	0.033	Digitalisation	0.011
technology	0.014	artificial intelligence	0.019	Business	0.008
digital technology	0.012	tourist destination	0.021	Pandemic	0.010

augmented reality	0.009
bibliometric analysis	0.007
cultural heritage	0.008
heritage tourism	0.011

Source: own study

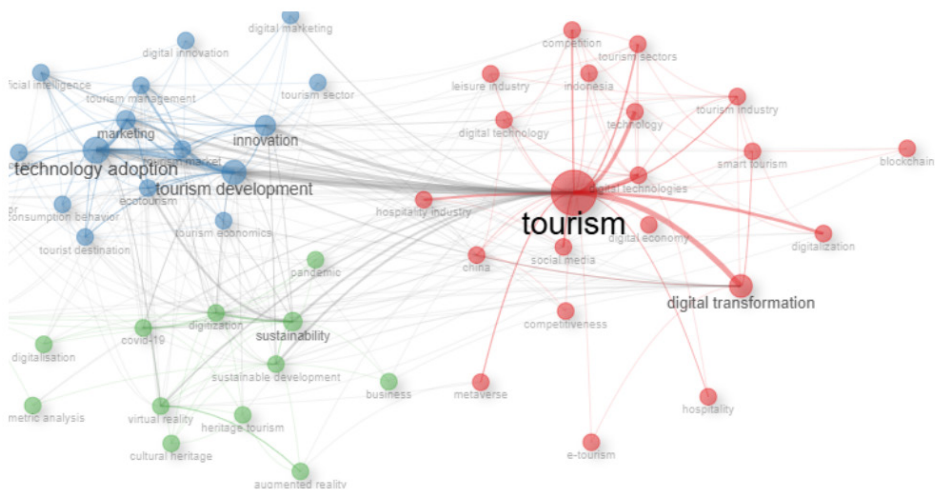


Figure 6. Co-occurrence network of authors' keywords using VOSviewer

Source: own study

5. Interpreting the findings and results

The bibliometric literature review provides a picture of intellectual development, the conceptualisation and the new research directions of the concept of digital capabilities in tourism entrepreneurship. The findings do not reflect a theoretically fully developed and self-consistent field of knowledge, but rather a field of knowledge that is still in a state of rapid growth and intellectual disintegration, that has developed due to the increasing digitalisation of tourism, the development of artificial intelligence (AI), platform economies and smart destination projects. The high level of publications over the last decade demonstrates how digital skills have become a central competency in the organisation and have come to be seen as a key tool for innovation, dealing with a non-stable market and adding value to sustainable tourism. The discovery relates to the larger body of digital entrepreneurship literature, stating that a competitive edge is increasingly based on an organisation's capacity to continually access, assimilate and reimagine digital resources as opposed to technology adoption.

The performance analysis reveals that research interest has increasingly focused on technology adoption as an operational rather than a strategic phenomenon, and that digital capabilities are more viewed as enabling entrepreneurial competitiveness. The most cited studies are related to digital transformation (Fraginière et al., 2022; Kritikos et al., 2025), the creation of innovation capability (Fernandes, 2021; Kritikos et al., 2025; Mexia et al., 2026), technology adoption (Alford & Jones, 2020; Han et al., 2025; Sharma & Sharma, 2023), and smart tourism ecosystems (Gajdošík & Vaneková, 2026; Paliwal et al., 2024; Pencarelli, 2020), highlighting the growing understanding of researchers about the multi-dimensional character of digital capability development. Previous research has tended to focus on the adoption of specific digital tools like websites, social media or online booking tools. However, contemporary literature focuses more on digital capabilities and higher-order organisational abilities that involve digital learning, analytics, decision-making using AI, platform integration, and knowledge management. This evolution is in line with the Dynamic Capabilities Theory that states that the competitive advantage of organisations is rapidly changing environments lies in their ability to continuously sense, seize and reconfigure resources from the internal and external environment instead of just acquiring a technology. The literature review reveals that the focus of tourism entrepreneurship literature has shifted from being technology-based to a capability-based approach, which points to organisational adaptability and strategic renewal.

Majority of contributions come from the technologically advanced economies of China, Europe, North America and others, highlighting our focus for digital capability research within our technologically advanced tourism system. These areas are important for empirical evidence on digital innovation and entrepreneurial transformation, yet there is a clear imbalance in the current knowledge base, as there is a lack of representation

of developing economies. As a result, the existing theoretical framework may not fully represent the contextual complexities that impact digital capability development in different tourism contexts. This discovery is a strong argument for research to be conducted across and internationally, in order to build upon current theories in developed market settings and, more generally, to increase the knowledge base for a more globally represented technology of tourism and entrepreneurship.

The science mapping analysis also gives further insights into that intellectual organisation of the science field by highlighting a shift from technology-oriented research to capability-oriented knowledge development. Bibliographic coupling highlights the growing interest among researchers concerning the capability of organisations, not just about new technologies, and shows that the broader the use of digital resources within a firm's strategic and organisational processes, the greater the chances of entrepreneurial success. Likewise, co-word analysis shows that the notion of digital transformation is gaining momentum with concepts like innovation, entrepreneurship, artificial intelligence, smart tourism, sustainability and competitiveness. These concepts are not mutually exclusive research streams, but rather, they all serve to show how digital capabilities can be considered as the glue in an integrated knowledge domain, where technological innovation and entrepreneurial performance are interconnected. The intellectual conceptualisation can be considered as a continuation of the previous bibliometric research, as it establishes that the field of tourism entrepreneurship is becoming more interdisciplinary.

In addition to the theoretical insights, addressing RQ5, the thematic clustering analysis gives, it also shows that the digital capabilities in tourism entrepreneurship are multidimensional. The first cluster on digital transformation and capability development highlights that the competitive advantages of digital investments can be realised not only by investing in technology but also by integrating digital resources into an organisation's daily operations, decision-making and consumer approach. This discovery offers sound empirical evidence for the Dynamic Capability Theory, which states that sustainable enterprise performance is a result of the capacity of organisations to constantly refresh their competencies to meet environmental change. In tourism entrepreneurship, these complementary organisational capabilities of digital literacy, platform management, social media capability, and data analytics are all considered to enhance the innovation and strategic flexibility of tourism. Digital transformation must therefore be seen as a continuous process of building the organisation's capability, and not as a one-time technology intervention.

The second thematic cluster is about the ongoing relevance of technology adoption research and the theoretical boundaries of this research. Although nowadays the dominant technologies are AI, virtual reality, cloud computing, mobile applications and smart tourism systems, the bibliometric results show that the success of entrepreneurship is not only due to the technology used. While traditional models like

the Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT) and Diffusion of Innovation (DOI) are important to explain behavioural intentions and adoption decisions, they do not offer much explanation for how entrepreneurs subsequently build organisational capabilities that create sustained competitive value. Based on the present results, the authors consider that the studies on tourism entrepreneurship should take into account the incorporation of technology adoption theories with strategic management approaches if the aim is to enhance the understanding of how the digital technologies are translated into long-term organisational performance.

The third cluster emphasises the role of digital skills for entrepreneurial performance and sustained competitiveness. This stream of research is dominated by the Resource-Based View, which has gained increasing attention in the research community, as a belief has emerged that digital capabilities can be regarded as valuable, rare, difficult to imitate, and organizationally embedded resources that can lead to sustained competitive advantage. The bibliometric results also suggest, however, that the source of competitive advantage is moving away from mere digital assets and towards how technological resources, organisational learning, innovation capability and managerial decisions interact. Digital capabilities are thus not just strategic resources, but organisational mechanisms for continuous innovation, resilience, and adaptability in the face of technological disruption.

The fourth cluster shows that there is a clear shift in the research in tourism entrepreneurship towards an ecosystem approach. Recognising that entrepreneurial value creation takes place within interconnected smart tourism ecosystems, which include tourists, destination management organisations, technology providers, governments, local communities and digital platforms. This finding is consistent with current ecosystem thinking which puts a strong emphasis on cooperation, knowledge sharing and co-creation as crucial enablers of innovation. The growing body of literature describes digital capabilities as relational capabilities instead of a singular organisational phenomenon, enabling coordination, integration of resources and value co-creation among multiple stakeholders. This ecosystem view extends the theoretical discussion of tourism entrepreneurship well beyond the organisational level to an inter-organisational and destination level of digital capabilities, thus contributing to the resilience and sustainability of tourism domain.

Thus, the results indicate that generally there is a clear intellectual development trend from technology-oriented research to a more holistic, capability-based approach to the understanding of tourism entrepreneurship. This view shows how performance analysis, science mapping and thematic clustering have interconnected to make digital capabilities a key theoretical building block in innovation, organisational learning, strategic management and ecosystem collaboration. The study not only brings together the scattered knowledge base but also contribute to the research of tourism

entrepreneurship by establishing digital capabilities as the dynamic capability on which tourism business gain resilience, competitiveness and sustainable development in the digital and interconnected tourism domain.

6. Conclusion

This bibliometric literature review offers a literature synthesis of digital capabilities within tourism entrepreneurship. It highlights the field's intellectual structure, thematic cluster development, and future research areas. The current findings state that digital capabilities have become the centre of focus, positively reflecting the impact of digital transformation on tourism ecosystems. There is an upward movement in the research publications since the last decade, revealing the significant impact of digitalisation on entrepreneurial innovation, competitiveness and resilience in an evolving landscape of technology. The current study identifies four principal thematic clusters demonstrating a changing trend from a preliminary technology-centric phase to concrete value creation within complicated digital environments.

The review also highlights several important research gaps. Most existing studies are concentrated in developed economies, while emerging tourism destinations remain significantly underrepresented. In addition, limited attention has been given to how the entrepreneurs engaged in the tourism ventures address technological, financial, and capability-related challenges as they adapt to and implement digital transformation.

From a practical perspective, the findings highlight the need for tourism entrepreneurs to adopt digital technologies and develop dynamic digital capabilities that enable innovation, adaptability, and long-term competitive advantage. Policymakers and destination management organisations may also play the role in strengthening digital infrastructure, offering relevant entrepreneurial training and creating supportive innovation ecosystems. By consolidating the fragmented research of more than twenty-five years, this review provides a comprehensive understanding of digital capabilities in tourism entrepreneurship. It also offers a forward-looking research agenda that can guide future researchers while supporting theory development, evidence-based policymaking, and empirical research to advance digital transformation in the tourism sector.

While this study provides a comprehensive overview of digital capabilities in tourism entrepreneurship, several limitations should be acknowledged. Although the Scopus database is widely recognised for its extensive coverage, relying solely on this source may have excluded relevant studies indexed in other databases or published in languages other than English. Future systematic reviews could strengthen the evidence base by incorporating additional databases, such as Web of Science and Dimensions, as well as including studies published in multiple languages where feasible.

Furthermore, citation-based indicators may have favoured older publications. Considering this, the current authors have conducted an inclusion of science mapping techniques to provide a more balanced perspective. Minor variations arising from key standardisation and indexing practises may also influence work visualisations. Further studies could strengthen the field by integrating alternative impact metrics, longitudinal analysis or meta-analytic approaches to further enrich the understanding of this evolving research domain.

Addressing RQ7, the researchers found that future tourism entrepreneurship research may address critical theoretical, methodological, and contextual gaps. Emphasis on stronger theory development to capture complex relationships between entrepreneurs, resources, and institutions, specifically in the tourism sector remains unexplored. Methodological advances may include mixed methods, longitudinal, and quantitative studies to improve rigour and generalisability in the field. Key underexplored areas include nascent, necessity, digital, crisis-related, and family firm entrepreneurship in the tourism sector, with greater geographic diversity and focus on gender, power and sustainability. Research currently emphasises trends (RQ8) like technology adoption and marketing, leaving tourism entrepreneurs' lived experiences and critical identity perspectives in the emerging economies underexplored. The interrelationship among sustainability, resilience, and the circular economy remains limited. Addressing these gaps through theory-driven, context-sensitive research may enable a more coherent, inclusive, and impactful field.

Authors' contribution

S.D.: article conception, theoretical content of the article, research methods applied, conducting the research, data collection, analysis and interpretation of results, draft manuscript preparation. **P.T.:** conducting the research, data collection, analysis and interpretation of results, draft manuscript preparation.

Declaration of Generative AI and AI-assisted technologies in the writing process

During the preparation of this work the authors use Chat GPT for editing assistance. The authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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