

The Impact of Digital Transformation on the Development of the Tourism Industry: Bibliometric Analysis

Ayu Satiti*, Udin Udin

Management Department, Universitas Muhammadiyah Yogyakarta, Indonesia. *Corresponding Author's Email: ayusatiti151287@gmail.com

Abstract

This research examines the impact of digital transformation on the tourism industry through bibliometric analysis. Articles from the Scopus database covering the period 2019–2023 were analyzed, resulting in 183 relevant documents. The research employs CiteSpace to visualize keyword occurrences and international collaboration, while VOSviewer is utilized to explore author collaborations. Findings reveal a consistent annual increase in publications on digital transformation within the tourism sector. The bibliometric analysis identified key research themes, with prominent keywords including 'Tourism' (89 occurrences), 'Digital Marketing' (17 occurrences), and 'Digital Transformation' (14 occurrences). Furthermore, significant international collaborations involving countries, research institutions, and individual researchers emphasize the global scope of digital tourism research. This study underscores the importance of digital innovation in advancing the tourism industry. Emerging areas such as the digital divide, tourism destinations, and virtual tourism are identified as underexplored topics with significant potential for future research. By highlighting global collaboration and trends, this study offers valuable insights into the evolving dynamics of digital transformation in tourism. The findings enhance the existing body of knowledge and lay a foundation for further exploration of this interdisciplinary and impactful field.

Keywords: Bibliometric Analysis, Digital Marketing, Digital Tourism, Digital Transformation, Tourism Industry.

Introduction

In recent years, the tourism industry has attracted significant attention from stakeholders due to its ability to drive economic growth in countries with abundant natural resources and adequate infrastructure to support tourism (1). The travel industry has undergone significant changes due to digital technology, transforming the previously traditional tourism ecosystem into a modern and more accessible system for customers (2). Technological advancements drive the transformation of the tourism industry into a digital framework (3). Online resources, such as websites, traditional media, social media, tour operators, and influencers, act as marketing tools for the tourism sector, providing tailored information to meet the needs of diverse audiences exploring various destinations (4). This prompts an examination of how the adaptation of digital transformation can enhance tourism, streamline consumer travel to tourist sites, and amplify its impact on users and stakeholders in the industry (5). The swift dissemination of information to consumers and the diverse strategies employed in

product marketing within the tourism sector have facilitated access to tourist locations through digital tools and technologies, marking a transformative shift in the industry (5). The rapid advancement of digitalization and the use of innovative tools can facilitate more efficient collaborations and hold significant potential for growth in the tourism industry (6). This paradigm shift has led to structural changes among market participants in the tourism industry. It enables the provision of services and goods at tourist attractions or through tour operators catering to tourists (4). Digitalization has transformed the traditional trade system, introducing new challenges (7). Digital transformation is crucial for stakeholders in the tourism industry, as it can drive significant changes for customers. If stakeholders fail to adapt to technological advancements, they will struggle to compete (8). The tourism industry has garnered significant attention for its ability to drive economic growth, particularly in countries with abundant natural resources and robust infrastructure.

This is an Open Access article distributed under the terms of the Creative Commons Attribution CC BY license (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted reuse, distribution, and reproduction in any medium, provided the original work is properly cited.

(Received 19th September 2024; Accepted 02nd January 2025; Published 31st January 2025)

Digital transformation, driven by technological advancements, has fundamentally reshaped the traditional tourism ecosystem, making it more accessible and efficient for consumers. Previous studies have used bibliometric analysis to create knowledge maps in digital tourism, examining publication trends, author emergence, institutional contributions, research areas, hotspots, and the evolution of digital tourism. These studies highlight that social and environmental sciences are key disciplines in this field (9). While previous studies have extensively explored digital tourism through bibliometric analysis, a notable gap remains in understanding the collaborative dynamics between researchers, institutions, and nations, as well as identifying the most influential works in this field. This study seeks to fill this gap by offering a comprehensive analysis of the impact of digital transformation on the tourism industry from 2019 to 2023.

Building on previous research, this study focuses on the collaboration between researchers, institutions, and nations in conducting joint research, as well as identifying the most cited works in this field. This will help researchers understand the evolving impact of digital transformation on the tourism industry and its future trends. This study aims to examine the evolution of the impact of digital transformation on the tourism industry by analyzing advancements in tourism-related topics over the past five years. By exploring these development trends, we can better understand the extent of digital technology's influence on the future of sustainable tourism. The tourism industry has undergone a major transformation due to digital innovation, disrupting the traditional tourism ecosystem and transforming it into a modern one, characterized by dynamic business processes, adaptations in tourism services, technological improvements, and a highly competitive environment (10).

Digital Transformation in the Tourism Industry

Digital transformation represents a profound shift in the application of technology to improve the quality of the tourism sector. It is defined as a change driven by transitional factors that transform concepts from traditional to modern (11). The impact of digital technology on the evolution of the tourism sector is significant, as tourist attractions require systematic

technological management to facilitate interactions among them (12). In social exchange theory, this is referred to as an interaction process that aligns one need with another, allowing actors and customers to receive satisfying rewards and exchanges. It also serves as a mechanism to motivate local communities to utilize their resources for visitors (13). The modern tourism sector depends on digital information, with tourism services acting as the primary source of credibility for consumers (2).

The tourism industry comprises a range of services required by tourists and is considered an information-intensive sector. Choosing a destination involves extensive and dynamic information searches, with clients gathering data to make informed decisions and compare available service options (14). Digital technology opens up new opportunities for enhancing user experiences and service quality (15). Therefore, it is crucial to integrate the practical use of the web in planning, production, marketing, sales, and presentations, which forms an information-based service model. Topics such as security, simulation, the internet, cybersecurity, and blockchain are also discussed. Some of these definitions highlight significant motivation, development, and outcomes driven by digital transformation (11). Analyzing the rapid growth of the tourism industry provides valuable insights for future researchers and industry players, making it useful for understanding the social and environmental impacts, with many opportunities for managing tourism sustainably (12).

Digital Transformation Shapes the Tourism Industry Ecosystem

Digital tourism is a sector within the tourism ecosystem that provides diverse information to travelers and establishes an automated framework for tourism operations (9). It enables consumers to discover, customize, and purchase tourism products, while also facilitating the globalization of the sector by equipping agencies with effective tools for the global development and distribution of their offerings. As a result, digitalization will transform business models and shape the digital landscape (2). Additionally, digital tourism can influence consumer preferences through the information provided on digital platforms (4). Digital transformation examines the digitalization of the tourism ecosystem, assessing its impact on

virtual social processes and identifying essential innovative and creative skills (6). It refers to the substantial transformation of business operations through technology, integrating innovative solutions that influence market behavior and customer decision-making, thus redefining the service experience throughout the customer journey (15). This shift has led to a data-driven approach, where advances in digital technology create new service opportunities, such as new platforms for improving information delivery, novel ways to offer services to customers, and the development of new business models with digital integrity (16).

Methodology

This study focuses on papers related to digital transformation in the tourism industry, using qualitative methods and a literature review approach for analysis.

Data was sourced from the Scopus database, focusing on documents published between 2019 and 2023 to capture recent developments. All articles were selected exclusively from Scopus to ensure high-quality, peer-reviewed data. The utilized data sources comprise pertinent scientific articles identified by the keywords TITLE-ABS-KEY (Impact) AND KEY (Digital AND Tourism) AND PUBYEAR > 2019 AND PUBYEAR < 2023. The keywords "Impact" AND "Digital Tourism" were used.

Data analysis was conducted by examining annual publication counts, national contributions, international collaborations, academic disciplines, researcher partnerships, citation metrics, key issues, affiliations, and referenced works. This study uses two visualization tools: CiteSpace, which facilitates visual analysis of keyword co-occurrence and international collaboration, and VOSviewer, which analyzes author collaborations.



Figure 1: Data Meaning Step

The process of article mining using the Scopus database is carried out in multiple phases. In the first phase, the search was categorized using the terms 'Impact' and 'Digital Tourism' from titles, abstracts, or keywords, resulting in 183 documents. In the second phase, the timeframe was constrained to five years (2019–2023) to focus on the most recent references regarding the impact of digital tourism. In the third phase, the type of document to be analyzed was specified, including articles, conference papers, book chapters, reviews, and others, resulting in the same 183 documents. After reviewing the abstracts and titles, a few irrelevant records were excluded to enhance the relevance of the study. In the fourth phase, keywords associated with the digital impact

on the tourism sector were examined, yielding 177 documents. In the fifth phase, to minimize linguistic bias, only documents in English were retained, resulting in 176 documents for analysis (Figure 1).

Results

Documents by Year

The annual volume of research papers is a key indicator for measuring the progress and significance of research in this field (9). This study examined the annual publication volume on the effects of digital transformation in the tourism industry using Scopus search results. Figure 2 illustrates a continuous increase in the distribution of scholarly articles, with projections indicating

that by 2022, there will be 68 publications addressing the impact of digital transformation on the development of the tourism sector. In 2019, there were 18 articles on this topic, despite the global pandemic, which significantly affected the tourism industry. The importance of this research

lies in understanding the role of digital technology advancements in the tourism sector, as these innovations have the potential to generate new ideas that could enhance the quality of the sector (15). Refer to Figure 2 for the number of publications over the past five years.

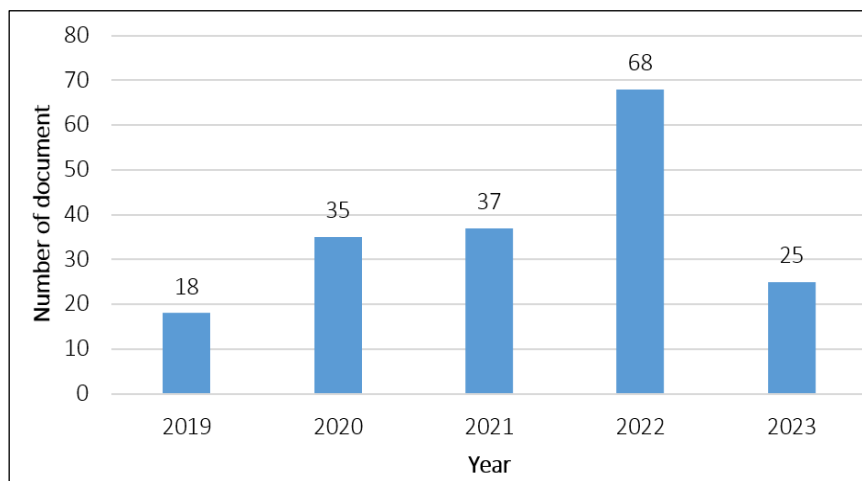


Figure 2: Publication by Year

Figure 3 shows that of the 183 scholarly articles published in Scopus-indexed journals, authors from 63 countries have contributed to the study of digital tourism. China leads with 34 publications. With 76 documents indexed by Scopus, it is evident that Asian countries exhibit the highest level of interest in researching the impact of digital transformation on the development of the tourism industry. Developing nations with prominent

tourism destinations, particularly those with significant research interest, stand to benefit greatly from this research. This highlights the importance of digital tourism research as a key reference for advancing the tourism sector in these countries (17). The steady increase in the number of publications signals growing interest in the role of digital transformation in tourism, with China and Portugal among the leading contributors.

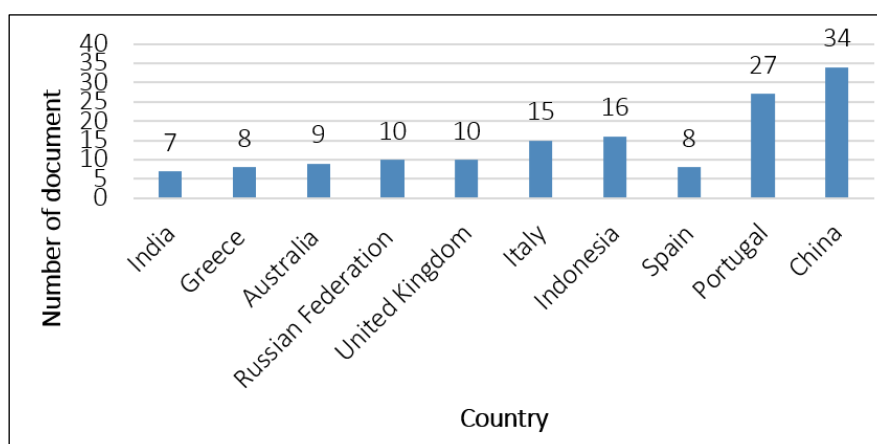


Figure 3: Publication Trends by Country

Figure 4 shows that several country clusters are collaborating extensively in analyzing the impact of digital transformation on the development of the tourism industry. These clusters include: (China, Indonesia, Australia, Malaysia, Pakistan, United Arab Emirates, Bangladesh, United States, South Korea, Uganda); (Portugal, Spain, Brazil, Iran,

Kazakhstan, Ireland, Peru, Chile, Czech Republic, Colombia); (United Kingdom, Finland, Namibia, Tunisia, South Africa, Germany, Macau, Department of Marketing and Market Research); (Italy, Russia, Saudi Arabia, Greece, Poland, France, Slovakia, Egypt); (Croatia, Turkey, Serbia, Jordan); (Sweden, Norway); and (Cuba, Ecuador). This

collaboration is crucial for joint research on the global impact of digital transformation on the tourism industry. Additionally, it helps establish

bilateral relations between countries, especially when addressing trending issues, thereby strengthening sustainable collaboration.

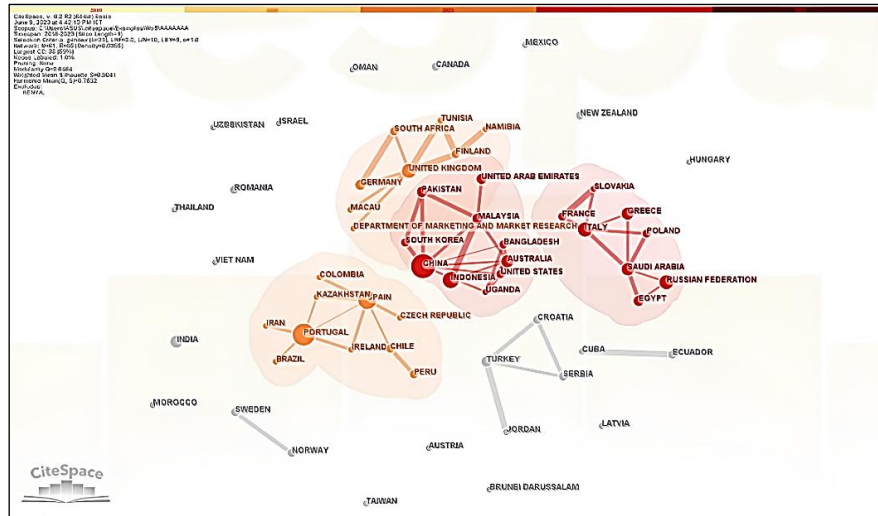


Figure 4: Maps of Collaboration Among Country

The findings highlight extensive collaboration among countries, particularly China, Indonesia, and Portugal, underscoring the global relevance of digital transformation in tourism. Authors and institutions have formed strong partnerships, facilitating knowledge exchange. Figure 5 illustrates that research examining the impact of digital transformation on the development of the tourism sector is increasingly significant across various scientific disciplines. The predominant fields are represented by 68 in Business,

Management, and Accounting, 66 in Social Sciences, and 37 in Computer Science. These three disciplines are highly relevant to the tourism industry and demonstrate a continuous interrelation between digital technologies and tourism practices. As noted by other researchers, advancements in digital technology create new opportunities and innovations that enhance service quality for users (15).

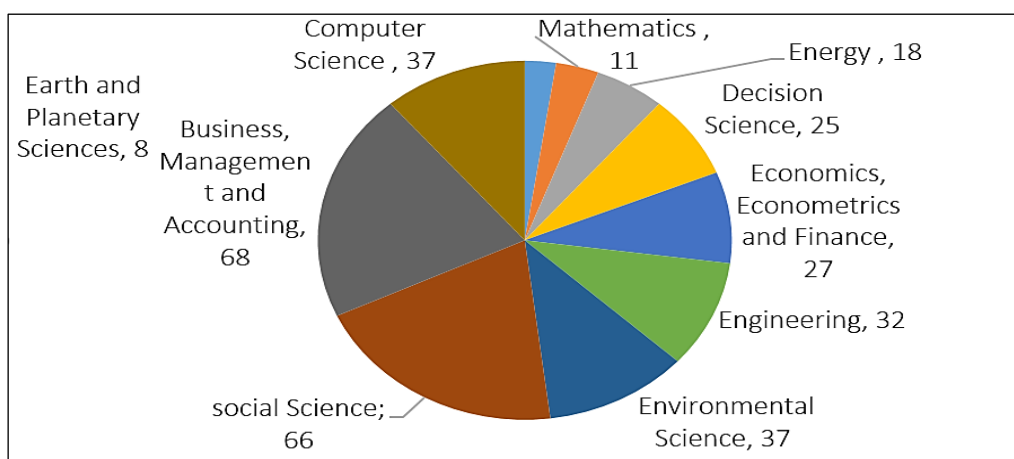


Figure 5: Highest Subject Presentation

Figure 6 shows that the largest number of publications on the impact of digital transformation on the development of the tourism industry were recorded. While each author contributed two articles, many of the 183 papers

involved 157 different authors. Several of these articles are highly relevant to the current state of the tourism sector, including 'Digital Transformation in Tourism Ecosystems: What Impact on Sustainability and Innovation?' (18) and

'Possibilities of Digital Business Models in Tourism — A Quantitative Report' (19). These articles examine the formation of a digital-based tourism ecosystem and the multifaceted effects of digital transformation on the tourism industry,

particularly for users of digital technologies. Therefore, the rapid development of digitalization and the use of new technological tools can facilitate more effective collaboration and hold significant potential for advancing the tourism industry (6).

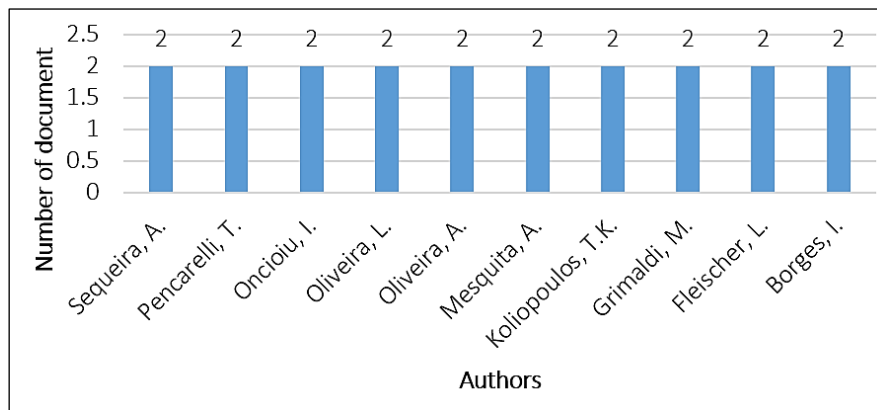


Figure 6: Publication by Author

Figure 7 illustrates collaboration among authors in examining the impact of digital transformation on the development of the tourism sector. This study involved 183 documents and 151 authors, of whom 4 collaborated on multiple papers. Notable collaborative works include 'The Labor Force Representing Future Activities and Initiatives to

Overcome Challenges Posed by Digital Transformation' (20) and 'Emergency Remote Work in Portugal: Assessment, Impacts, and Recommendations' (21). Collaboration between authors enhances the knowledge base and provides more reliable information in conducting research (9).

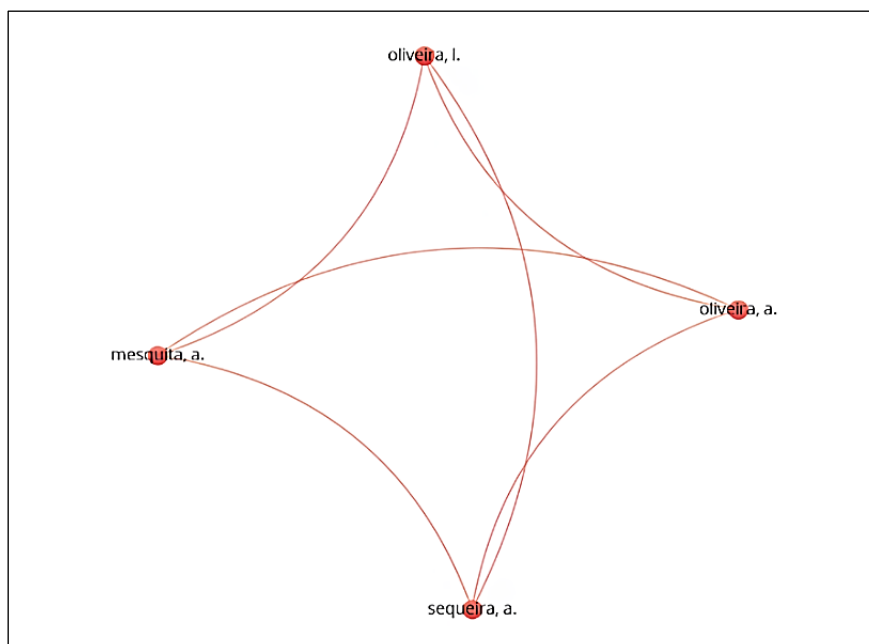


Figure 7: Author collaboration in Research

Figure 8 is based on 183 scientific articles published in Scopus-indexed journals, focusing on the impact of digital transformation in the tourism industry and collaborative affiliated articles, with Portugal being the predominant contributor. From previous studies it was found that institutions or

organizations collaborate to facilitate the acquisition of valid and relevant information related to the research theme (9). Publication by affiliation refers to the practice of researchers or authors listing their academic or institutional affiliation alongside their names in publications.

Listing a researcher’s affiliation in publications establishes a clear connection to a specific institution, university, or research organization. This formal link not only upholds academic integrity but also enhances the visibility and recognition of both the researcher and the institution. It plays a crucial role in reinforcing the

researcher’s professional identity and standing within the academic community, while also supporting the broader professional landscape. By highlighting the institutional backing behind the work, affiliation underscores the credibility and value of the research, fostering trust among peers and readers.

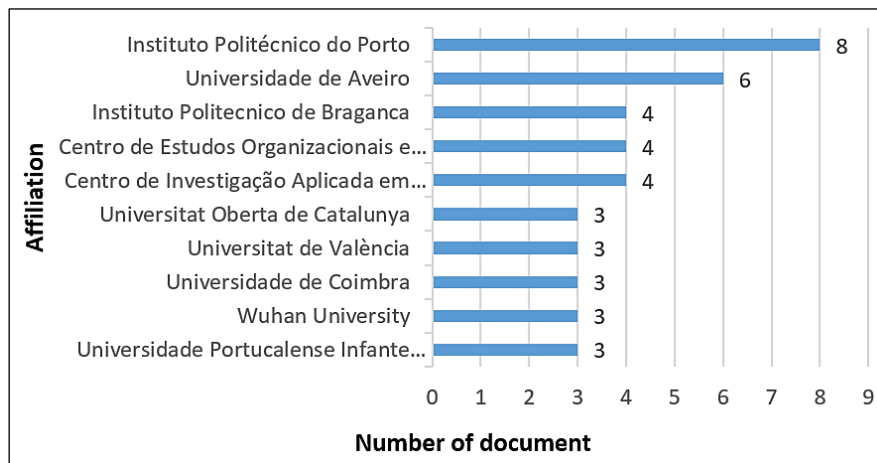


Figure 8: Publication by Affiliation

Table 1: List of Academic Institutions and Their Collaborative Affiliations

No	University/ Institute	University Place	Year	No. of Doc.	Collaborative Affiliations
1	Instituto Politécnico do Porto	Rua Dr. Roberto Frias, Porto, Portugal	2020-2022	8	Polytechnic Institute Of Oporto.
2	Universidade de Aveiro	Campus Universitário de Santiago, Aveiro, Portugal	2019-2022	6	Centre For Environmental And Marine Studies
3	Instituto Politecnico de Braganca	Campus de Santa Apolnia, Braganca Portugal, Portugal	2021-2023	4	Centro De Investigação De Montanha.
4	Centro de Estudos Organizacionais e Sociais do Politécnico do Porto	Rua Jaime Lopes Amorim, s/n, Sao Mamede de Infesta Porto, Portugal	2020-2022	4	Center For Organizational And Social Studies Of Porto
5	Universitat Oberta de Catalunya	Avinguda Tibidabo, Barcelona, Spain.	2020-2022	4	Open University Of Catalonia.

Table 1 presents the five affiliate institutes that collaborate with other institutions, with Instituto Politécnico do Porto being the leading institution, contributing eight documents on the impact of digital transformation on the tourism industry's

development. This table highlights the significant role of Instituto Politécnico do Porto in exploring this issue through its eight published works. The collaboration between research institutions underscores the global nature of digital tourism,

marked by productive partnerships in this field (9). The table also provides details about various universities and institutions, including their locations, research years, number of documents published, and collaborative affiliations. Notably, Instituto Politécnico do Porto in Porto, Portugal, conducted research from 2020 to 2022, publishing 8 documents in collaboration with the Polytechnic Institute of Oporto. The Universidade de Aveiro, also in Portugal, was active from 2019 to 2022, producing 6 documents in partnership with the Centre for Environmental and Marine Studies. Another key institution, the Instituto Politécnico de Bragança, published 4 documents from 2021 to 2023, collaborating with the Centro De Investigação De Montanha. Additionally, the Centro de Estudos Organizacionais e Sociais do Politécnico do Porto, located in São Mamede de Infesta, Portugal, contributed 4 documents between 2020 and 2022, in association with the Center for Organizational and Social Studies of

Porto. Lastly, Universitat Oberta de Catalunya in Barcelona, Spain, was active from 2020 to 2022, publishing 4 documents in collaboration with the Open University of Catalonia.

The institutions demonstrate active research collaboration, particularly with local or regional research centers such as the Polytechnic Institute of Oporto, the Centre for Environmental and Marine Studies, and the Centro De Investigação De Montanha. Most of these institutions are based in Portugal, with a significant presence in Porto, Aveiro, and Bragança, with the exception of one institution located in Barcelona, Spain. Research activities at these institutions span two to three years, typically between 2020 and 2023, highlighting the recent and ongoing nature of the work in this field. The number of published documents ranges from 4 to 8, with the Instituto Politécnico do Porto leading in output, underscoring its strong focus on academic publishing.



Figure 9: Network Visualization

In Figure 9, CiteSpace analytics interprets Scopus data and analyzes themes through content analysis. The investigation revealed 10 clusters that delineate research themes related to the impact of digital transformation on the development of the tourism sector. Each cluster contains a varying number of items and themes, with these discrepancies reflected in the network visualizations produced by CiteSpace. The primary research was derived from 10 clusters, which include a total of 183 items: Cluster #0 (34 items),

Cluster #1 (34 items), Cluster #2 (25 items), Cluster #3 (25 items), Cluster #4 (20 items), Cluster #5 (18 items), Cluster #6 (14 items), Cluster #7 (14 items), Cluster #8 (14 items), and Cluster #9 (12 items). This study explores the rapid development of the tourism industry, offering valuable insights for understanding its social and environmental impacts and presenting numerous opportunities for managing the sector effectively (12).

Table 2: Most Articles with High Citations

ID Cluster	Label	Citations
#0	Ar Technologies	Digital Tourism (13), Virtual Reality (9), Augmented Reality (8)
#1	Digital Transformation	Tourism (89), Digital (14) Transformation, Marketing (12).
#2	Digital Protest	Tourism Development (14), Digital Storage (12), Social Media (9).
#3	Digital Innovation	Digital Technology (12), Tourism Industry (13), Leisure Industry (7).
#4	Portuguese Tourist	Internet (6), Economic And Social Effects (5), Information Use (5).
#5	Covid-19 Era	Sustainable Development (12), Sustainable Tourism (5), Case Study (5).
#6	Focusing Tourism	17 Digital Marketing, 8 Tourism Sectors, 6 Digital
#7	Health Context	Covid 19 (19), Human (7), Humans (5).
#8	Arid Transgressive dune field	Article (8), Antennas (2), Digital Elevation Model (2).
#9	Attributional Approach	Tourist Destination (5), Information And, Communication Technology (4), and Social Network (3).

In Table 2, which summarizes the data from Table 1, the bibliometric analysis conducted using CiteSpace reveals a close relationship between the key themes of this study, such as Technologies, Digital Transformation, Digital Innovation, and Focusing Tourism. These themes are directly related to the effect of digital transformation on the development of the tourism industry. Additionally, the analysis highlights the most frequently cited keywords in the literature, including Tourism and Digital Marketing.

The high number of citations for these keywords underscores the significance of digital transformation in managing the tourism industry. Digital transformation within the tourism ecosystem involves a profound change in business operations through technology, integrating innovative technical solutions that can reshape market behavior and customer decision-making, ultimately redefining the service experience across the customer journey (15). The impact of digital technology on the growth of the tourism industry is substantial, as tourist attractions require

systematic technical management to facilitate interactions (12).

Based on the findings of this study, there is strong collaboration among authors, institutions, and nations to jointly analyze emerging trends in the tourism industry. This collaboration can foster scientific advancements by focusing on topics that continue to evolve over time (22). Additionally, it can provide new evidence for transnational cooperation within global institutions and organizations (9).

This study, as demonstrated by the findings in Figures 4, 7, and 8, highlights the significant collaboration between authors, institutions, and nations. This collaboration occurred due to the relevance of the field under study, which led to large and complex research efforts yielding multiple results. Additionally, the research was conducted using various scientific perspectives, with a total of 8 articles published through collaborative efforts, involving an average of more than 8 countries. This extensive cooperation

involved multiple groups and actors. These insights provide a valuable reference for analyzing trends in the impact of digital transformation on the development of the tourism industry. Studying the rapid advancement of the tourism industry can offer guidance for future researchers and tourism stakeholders, contributing to the social and environmental impacts with numerous opportunities for managing the industry (12).

Discussion

The Effect of Advanced Change on the Improvement of the Tourism Industry

The impact of the tourism industry on a nation is multifaceted, with tourism playing a crucial role in the overall progress of a country. Primarily, it significantly contributes to the economy by generating local employment, both directly within the industry and indirectly in various sub-sectors associated with tourism (23). The growth of the tourism industry acts as a catalyst, driving increased revenue in other domestic sectors. Notably, industries such as hospitality, accommodation, restaurants, catering, transportation, entertainment, and retail all experience boosted profits under the umbrella of tourism (1).

Digital transformation holds significant potential for promoting sustainability within the tourism industry. Emerging technologies, such as artificial intelligence (AI), blockchain, and the Internet of Things (IoT), empower stakeholders to optimize resource use, reduce environmental impacts, and enhance the overall sustainability of tourism operations. For example, AI-powered tools can analyze tourist behavior to create personalized, sustainable itineraries that minimize carbon footprints. Blockchain technology can improve supply chain transparency, ensuring that service providers follow sustainable practices. Additionally, virtual and augmented reality (VR/AR) contribute to sustainability by offering virtual tourism experiences that reduce the need for physical travel, lowering emissions while still providing opportunities for cultural and recreational exploration. Future strategies should focus on integrating these technologies into tourism operations to promote eco-friendly practices and strike a balance between tourism growth and environmental conservation.

While digital transformation drives innovation, it also presents critical challenges. The digital divide, marked by unequal access to digital resources and technologies, disproportionately affects developing regions, limiting their ability to engage with and benefit from advancements in digital tourism. Bridging this divide requires substantial investments in infrastructure, education, and technology access in underserved areas. Furthermore, as tourism increasingly relies on digital platforms, cybersecurity concerns are becoming more prevalent. The risks of data breaches, cyberattacks, and privacy violations pose significant threats to both service providers and tourists. Addressing these challenges demands the establishment of robust data protection frameworks, industry-wide security standards, and ongoing training for stakeholders to effectively mitigate risks. Overcoming these barriers is essential to ensuring equitable access to the benefits of digital transformation while maintaining trust and security within the tourism ecosystem.

Moreover, the tourism sector plays a crucial role in generating foreign exchange, which significantly benefits the national economy. This process not only contributes to the acquisition of capital resources but also injects new money into the economy. At the local level, tourism promotes economic diversification and supports the development of improved infrastructure. Increased activities in the tourism sector lead to higher tax revenues. However, it is important to recognize some economic drawbacks, such as the surge in demand that may drive up the costs of land, housing, and essential commodities due to heightened tourist activities. Additionally, the increased pressure on healthcare services and security provisions can become a concern (24).

Tourism has a significant social impact on a nation, improving the living standards of the local community through economic benefits. Moreover, cultural and recreational amenities can be leveraged to positively affect both residents and tourists. The community's image continuously evolves to meet the global standards it strives to uphold. Residents take pride in the recognition associated with being from a tourism-centric area, which further enhances their sense of esteem. This, in turn, fosters improved mutual understanding and unity among diverse populations (25).

Tourism has a profound cultural impact on a nation, as culture and tourism are intricately linked; the local culture shapes the overall tourist experience. This cultural dimension adds vibrancy and depth to a traveler's journey (6). While tourists may not always remember specific historical details of the places they visit, the cultural experience leaves a lasting impression. Tourism plays a vital role in fostering cultural awareness, and the revenue generated supports the preservation of historical monuments, archaeological sites, and ancient landmarks.

While some critics argue that tourism may dilute culture and its significance, it is important to acknowledge that culture thrives through sharing. Tourism acts as a platform for cultural exchange, enabling both local communities and travelers to benefit from mutual engagement (23).

This article highlights the contributions and developments that have significantly influenced the digital transformation of the tourism industry, demonstrating how technology has reshaped the sector. Stakeholders in the tourism industry have enhanced consumer experiences, streamlined operations, and created new business opportunities by leveraging cutting-edge technologies such as artificial intelligence, virtual reality, and data-driven platforms. The paper emphasizes the critical role of collaboration among academics, decision-makers, and business professionals in driving this transformation. For instance, partnerships among global organizations have facilitated the exchange of technological advancements and best practices, enabling travel agencies to adapt to the rapidly changing preferences and behaviors of their customers. Furthermore, the adoption of virtual tour platforms, online booking tools, and digital marketing strategies has improved accessibility, efficiency, and personalization within the travel industry.

The Effect of International Collaboration in Advancing Knowledge

By bringing together scholars, institutions, and resources from different countries, international collaboration is essential to the advancement of knowledge. This collaboration encourages the sharing of various viewpoints and interdisciplinary methods, enabling scholars to tackle global issues from a wider angle. International relationships are essential because

complex concerns like climate change, sustainable development, digital transformation, and global health require answers that cut across national borders. Such partnerships stimulate creativity and quicken the rate of scientific discovery by pooling resources and knowledge, which may not be possible through separate endeavors.

International cooperation has had a significant influence on tourism research. It makes it possible to exchange information on new developments in technology, emerging trends, and best practices that differ greatly between geographical areas. Partnerships between European and Asian organizations, for instance, have brought to light a variety of approaches to digital transformation and sustainable tourism. These partnerships enhance the global conversation on tourism and enable more comprehensive solutions by offering a comparative perspective of many contexts.

International cooperation also fosters cultural interaction and mutual understanding, which benefits the academic community. Researchers' intellectual horizons are expanded as they are exposed to new concepts, technologies, and methods. The importance of these collaborations is demonstrated by bibliometric analysis, which highlights their role in high-impact publications and the cross-disciplinary sharing of knowledge.

In the end, international cooperation not only improves the caliber of research but also lays the groundwork for a more knowledgeable and connected world community. It guarantees that the advantages of scientific progress are distributed globally by cultivating connections among researchers, so advancing mankind as a whole.

Conclusion

The tourist business is being reshaped by digital transformation, which is a key factor in fostering innovation, improving operational effectiveness, and creating individualized customer experiences. Modern technologies like virtual reality (VR), artificial intelligence (AI), and big data analytics have made it possible for tourism stakeholders to transform service delivery and adjust to the ever-changing demands of international tourists. But in spite of these developments, problems like the digital divide, the dearth of infrastructure in some areas, and the urgent need for sustainable practices continue to exist and must be resolved.

The paper emphasizes how crucial international cooperation is to promoting the digital revolution of the travel industry. The sharing of ideas, best practices, and technical advancements has been made possible in large part by cross-border collaborations. Through these partnerships, stakeholders have been able to address common issues including enhancing sustainability in tourism operations and adjusting to global crises. International collaborations have bolstered the global tourist ecosystem by combining resources and knowledge, encouraging adaptability and creativity.

Additionally, scholars now have a comprehensive understanding of recent advancements in digital tourism research because to the bibliometric analysis conducted for this study. By emphasizing important writers, foundational works, and recurrent research subjects, the study offers valuable insights into the intellectual atmosphere of the discipline. By pointing out both study gaps that need to be filled and areas of strength, it guides future scholarly endeavors toward noteworthy outcomes. The important role that data analytics and digital marketing play in improving tourist strategy is one of the noteworthy discoveries. For tourism businesses, these technologies have made it possible for more focused marketing, efficient use of resources, and improved decision-making. Stakeholders in the tourism sector may provide more individualized experiences and increase customer satisfaction by knowing the preferences and habits of travelers.

The study also highlights how important it is to address sustainability in the context of digital transformation. Although technology has made tourism operations more efficient, it must be used to advance fair access and ecologically friendly practices. In order to develop a tourist sector that benefits both local communities and global ecosystems, future research should concentrate on fusing digital tools with sustainable solutions. International cooperation has also improved the ability to share knowledge and innovate. It has promoted mutual learning and a deeper understanding of culture among scholars, practitioners, and policymakers. These international collaborations offer a solid basis for creating solutions that can be tailored to various situations and difficulties, guaranteeing that

everyone may take advantage of the advantages of digital transformation.

To sum up, this article's findings demonstrate how technology and teamwork may revolutionize the travel industry. The tourist sector can attain increased resilience, creativity, and sustainability by tackling present issues and capitalizing on global collaborations and technology breakthroughs. The study's conclusions offer a path forward for further investigation and real-world implementation, guaranteeing the global tourist industry's continuous development and pertinence in a world growing more digitally connected.

Limitations and Future Research

Through bibliometric research, this study provides valuable insights into the impact of digital transformation on the travel and tourism sector. However, several limitations should be acknowledged, as they point to areas where further research can enhance our understanding and address existing gaps. A key limitation is the reliance solely on the Scopus database, which, while comprehensive, excludes research from other important databases such as Web of Science and Google Scholar. Future studies should incorporate multiple databases to allow for a more thorough and inclusive analysis, as this narrow focus may result in an incomplete representation of the research landscape. Additionally, this research found no representation of publications from underrepresented regions such as South America and Africa, where there are unique opportunities and challenges related to the digital revolution in tourism. By excluding research from these areas, this research misses the opportunity to offer a more comprehensive and balanced perspective on the global impact of digital transformation in tourism. Including studies from these regions will not only enrich understanding of how digital technologies are shaping the tourism industry in diverse geographic contexts, but also highlight the different cultural, economic, and infrastructural factors that influence digital adoption and tourism development. This will ultimately contribute to a more inclusive and comprehensive analysis of the impact of the digital revolution on the tourism sector worldwide. The limited scope of the analysis, which only looked at articles from 2019 to 2023, is another drawback. Although this method takes into account recent

advancements, it runs the danger of ignoring earlier patterns and seminal research that have influenced digital tourism over time. Future studies that extend the time frame may uncover long-term trends and offer a more thorough comprehension of the development of digital transformation in the travel industry. Additionally, despite using powerful bibliometric tools like CiteSpace and VOSviewer, the study only includes basic analyses and leaves out other metrics like the authors' h-index, the intensity of collaboration, and network centrality, which could provide more in-depth understanding of academic impact and collaboration dynamics. Another area for development is the analysis's thematic depth, which focuses on major themes without exploring more recent subjects like cybersecurity issues, digital sustainability, or the application of AI in tourism. Future studies should focus on these understudied areas to get a more complex picture of the landscape of digital revolution.

Future studies could look in a number of interesting avenues to build on these constraints. Examining cutting-edge technologies like virtual reality, augmented reality, and blockchain would show how these developments are improving visitor experiences and revolutionizing tourist operations. Furthermore, there is a rising need to investigate the relationship between sustainability and digital innovation, specifically how technology might support fair access to tourism services and encourage eco-friendly practices. Comparative regional studies that look at different regions' levels of digital maturity could offer insightful information about regional best practices and problems, allowing for a more globally applicable understanding. It would also be beneficial to broaden the study of the dynamics of international collaboration since this could reveal methods for promoting transnational alliances and enhancing knowledge sharing in the travel industry. Last but not least, carrying out longitudinal research that charts the development of digital transformation in the travel industry over several decades may reveal persistent patterns, changes, and the cumulative effect of technology breakthroughs. Scholars may advance a more thorough understanding of digital change in the tourist sector and its wider implications for innovation, sustainability, and international cooperation by

tackling these constraints and following these prospective research avenues.

Researchers may close current knowledge gaps by broadening their studies to include underrepresented regions, examining the relationship between sustainability and digital transformation, and looking at upcoming technologies. Strategic planning may benefit from longitudinal research examining the long-term effects of digital innovation on consumer behavior and tourist sustainability. Furthermore, comparing areas with different degrees of digital maturity might aid in the discovery of successful localized tactics. By incorporating these suggestions, the travel industry can address major issues and promote a more inclusive global tourism environment, all while using digital transformation as a fuel for sustainable growth.

Abbreviations

Nil.

Acknowledgment

We would like to thank Dr. Udin Udin for his guidance and suggestions, which helped ensure the successful completion of this manuscript.

Author Contributions

Ayu Satiti: Wrote the manuscript, provided data, and analysis, reviewed the manuscript, Udin Udin: Provided feedback of article, reviewed the manuscript.

Conflict of Interest

The authors declare no conflicts of interest.

Ethics Approval

Not applicable.

Funding

None.

References

1. de Pina H, O'Neill H. Digital transformation of tourism in Cabo Verde: case study. *CAPSI 2022 Proceedings*. 2022;56:209-220.
2. Pranita D, Kesa DD. Digitalization methods from scratch nature towards smart tourism village: lessons from Tanjung Bunga Samosir, Indonesia. *J Phys Conf Ser*. 2021;1933(1):012053.
3. Sari R, Prabowo H, Gaol FL, Hastiadi FF. Tourism digital economy model based on digital transformation concept for tourist village in Indonesia. *Int J Emerg Technol Adv Eng*. 2021;11(10):81-87.
4. Oncioiu I, Priescu I. The use of virtual reality in tourism destinations as a tool to develop tourist behavior perspective. *Sustainability*.

- 2022;14(7):4191.
5. Thees H, Störmann E, Thiele F, Olbrich N. Shaping digitalization among German tourism service providers: processes and implications. *J Tour Herit Serv Mark.* 2021;7(2):3-15.
 6. Boiko M, Bosovska M, Vedmid N, Melnychenko S, Stopchenko Y. Digitalization: implementation in the tourism business of Ukraine. *Probl Perspect Manag.* 2022;20(4):24-41.
 7. Kurniawati E, Kohar UHA, Meiji NHP, Handayati P, Ilies DC. Digital transformation for micro, small, and medium enterprises to develop sustainable community-based marine tourism. *Afr J Hosp Tour Leis.* 2022;11(2):1118-1127.
 8. Wiraputra RH, Noviaristanti S. Digital transformation challenge in Bank Rakyat Indonesia Regional Office Denpasar. *eProceedings of Management.* 2022;9(6):3233-3236.
 9. Luo C, Jiang S, Pu R, Li L, Yang H. Knowledge map of digital tourism: a bibliometric approach using CiteSpace. *Probl Perspect Manag.* 2022;20(4):573-587.
 10. Popova P, Petrova M, Popov V, Marinova K, Sushchenko O. Potential of the digital ecosystem for the sustainable development of the tourist destination. *IOP Conf Ser Earth Environ Sci.* 2023;1126(1):012021.
 11. Winarsih I, Indriastuti M, Fuad K. Impact of COVID-19 on Digital Transformation and Sustainability in Small and Medium Enterprises (SMEs): A Conceptual Framework. *Advances in Intelligent Systems and Computing.* 2021;1194:471-476.
 12. Firman A, Moslehpour M, Qiu R, Lin PK, Ismail T, Rahman FF. The impact of eco-innovation, ecotourism policy and social media on sustainable tourism development: evidence from the tourism sector of Indonesia. *Econ Res Istraz.* 2023;36(2):1-20.
 13. Pappa E, Didaskalou E, Kontogeorgis G, Filos I. Strategic management of tourism sustainability through the Greek stakeholders' perspective on the impacts of events: the case of Patras' Carnival, Greece. *WIT Trans Ecol Environ.* 2022;256:85-95.
 14. Madzík P, Falát L, Copuš L, Valeri M. Digital transformation in tourism: bibliometric literature review based on machine learning approach. *Eur J Innov Manag.* 2023;26(7):177-205.
 15. Troisi O, Visvizi A, Grimaldi M. Digitalizing business models in hospitality ecosystems: toward data-driven innovation. *Eur J Innov Manag.* 2023;26(7):242-277.
 16. Zentner H, Gračan D, Barkidija Sotošek M. Digital business models in the hospitality sector: comparing hotel bookings with yacht charter bookings. *Sustainability.* 2022;14(19):12755.
 17. Zainal-Abidin H, Scarles C, Lundberg C. The antecedents of digital collaboration through an enhanced digital platform for destination management: a micro-DMO perspective. *Tour Manag.* 2023;96:104691.
 18. Troisi O, Grimaldi M, Visvizi A. Digital Transformation In Tourism Ecosystems: What Impact On Sustainability And Innovation? *Springer Proceedings in Complexity.* 2023;73-81. http://dx.doi.org/10.1007/978-3-031-19560-0_5
 19. Härting RC, Bäuerle M, Bilge K, Fleischer L, Landgraf N, Wicher M. Potentials of Digital Business Models in Tourism—A Quantitative Study. *Smart Innovation, Systems and Technologies.* 2021;241:311-321.
 20. Mesquita A, Oliveira A, Sequeira A, Oliveira L, Silva P. The Workforce of the Future - Projects and Initiatives to Overcome the Challenges Enacted by the Digital Transformation. *Smart Innovation, Systems and Technologies.* 2020;171:253-262.
 21. Oliveira L, Mesquita A, Oliveira A, Sequeira A. Emergency remote work in Portugal: Evaluation, effects, and recommendations. *Smart Innovation, Systems and Technologies.* 2021;209:304-313.
 22. Thees H, Störmann E, Thiele F, Olbrich N. Shaping digitalization among German tourism service providers: Processes and implications. *J Tour Herit Serv Mark.* 2021;7(2):3-15.
 23. Barykin SE, de la Poza E, Khalid B, Kapustina IV, Kalinina OV, Iqbal KM. Tourism industry: Digital transformation. In *Handbook of research on future opportunities for technology management education.* IGI Global. 2021: 414-434. <http://dx.doi.org/10.4018/978-1-7998-8327-2.ch025>
 24. Kumar S, Shekhar. Digitalization: a strategic approach for development of tourism industry in India. *Paradigm.* 2020;24(1):93-108.
 25. Gutierrez I, Ferreira JJ, Fernandes PO. Digital transformation and the new combinations in tourism: a systematic literature review. *Tour Hosp Res.* 2023. <http://dx.doi.org/10.1177/14673584231198414>