

A Quantitative Analysis of Global Scientific Literature on Tourism and the Digital Economy: Moving Towards Sustainable Tourism

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The rapid expansion of the digital economy has significantly enhanced the economies of all countries. The travel and tourism sector has been revolutionised by modern digital technology. It is expected that the digitalization of tourism will boost the travel and tourism sectors globally, surpassing GDP growth rates and returning to pre-pandemic levels by 2023. There are expectations that the tourism industry will move towards more inclusive economies and sustainable travel. Due to the growing volume of research in this field, the study presents and examines a range of published works on digital economy and tourism. Data for this study was obtained from the Scopus database in July 2023. The research identified 594 documents for further investigation based on the search phrase results. The VOS viewer was used in this investigation to display the data. This study examined key quantitative indicators such as publication growth, citation

analysis, and research production. Since 2001, there has been a noticeable increase in the research on tourism and the digital economy. Expectedly, 1391 (92.38%) of the documents were authored by multiple individuals. Based on a detailed analysis of different countries, China is the top country in scientific publications, with 93 documents published, accounting for 11.88%. Gretzel et al. (2015) received the most citations, averaging 49.88 citations per year. An in-depth analysis is required in this research area due to the growing volume of literature on tourism and the digital economy.

Keywords: Tourism; Digital Economy; Sustainable Tourism, Inclusive Economy; Quantitative Analysis.

Introduction

The digital economy is the result of extensive online connections between individuals, businesses, devices, data, and processes, as emphasised by multiple researchers (Hojeghan & Esfangareh, 2011; Marx et al., 2021; World Economic Forum, 2022). The digital economy is a rapidly expanding sector that merges cutting-edge technologies with traditional economic principles. The digital economy has significantly enhanced the economic performance of countries globally, particularly in terms of their gross domestic product (GDP). The digital economy has been instrumental in boosting a slow economy that we have observed in recent years. The digital economy has quickly spread to all traditional sectors, providing a necessary economic boost for countries around the globe. The digital economy in Southeast Asia is valued at US\$300bil (RM1.32 trillion) and is projected to expand fivefold in the next five to seven years (Dhesi, 2023). This would result in an expansion across digital services, digital products, and various e-platforms.

In today's global economy, one of the significant sectors driving growth is the tourism industry (Morales, 2022). Several countries around the world, particularly developing nations, are depending on their tourism sector to boost their economies quickly. Under-developed countries are increasingly looking towards the tourism sector to boost their economy as traditional industries begin to stagnate. In the upcoming decade, the travel and tourism industry are expected to generate over 126 million new jobs, according to the most recent Economic Impact Report (EIR) from the World Travel & Tourism Council. The World Travel & Tourism Council (WTTC) predicts that the travel and tourism industry will generate one-third of all new jobs globally, reflecting a positive outlook for job creation (World Travel & Tourism Council, 2023). Digital technology has significantly influenced the tourism sector. The tourism industry is being transformed by the digital economy, as highlighted by Divinagracia et al. (2012). There are numerous ways in which technology has impacted the industry. Technology adoption in tourism research has received significant support, as evidenced by Li et al. (2020). The increase in digital souvenirs, digital music, digital pictures, and electronic tickets has led to a significant transformation of the tourism sector into a digital-based industry.

Given the increasing amount of digital tourism-related studies, it is valuable to analyse the overarching trends identified in these studies. Utilising bibliometric analysis allows for statistical evaluation and quantification of the number and growth

trends within a particular subject. This method can also provide visual representations of publication subject areas, including geographical distribution, authorship, citation, keywords, and more. Moreover, thorough bibliometric analysis aids in predicting and fostering research growth within a specific research field (Tao et al., 2020). The review employed quantitative methods to pinpoint topical clusters and trending subjects prevalent in recent years. Previous research has highlighted social tourism and the digital economy as areas that have not been extensively covered in the existing literature (Det Udomsap & Hallinger, 2020). This analysis will examine aspects related to publication classification, citations, authorship details, publication impact, and country of focus.

Even though there is a growing focus on research in digital tourism, there have been limited efforts to analyse past publications and trends, especially those using bibliometric methods. In their study, Arenas Escaso et al. (2022) focused solely on 37 publications. Several studies have utilised bibliometric analysis in different study disciplines. These references cover a range of fields: environmental science (Li et al., 2023), social science (Handoko, 2021), and business management (Nassanbekova & Yeshenkulova, 2022). The paper is structured in the following manner: In Section 2, the methodology is presented. In Section 3, the empirical results are depicted. Section 4 concludes with the presentation of the research findings and specific recommendations.

Methodology

Researching scientific publications involves analysing various aspects such as research topics, methodology, prominent scholars, institutions, and publications (Zakaria et al., 2023). The study made use of the Scopus database and performed a search focusing on title, keywords, and abstract in July 2023. Scopus database was selected as the primary source due to its comprehensive nature and extensive scholarly information, allowing for a more comprehensive understanding of the research area. One of the main reasons for choosing Scopus is its database, which includes peer-reviewed literature and high-quality web sources across different disciplines and research fields. Scopus was selected as the exclusive data source for this study due to its reliability, high-quality data, extensive coverage, advanced analytics, and cutting-edge technology (Elsevier, 2023). Research has shown that Scopus provides broader source coverage compared to the Web of Science in fields beyond medicine and the physical sciences (Det Udomsap & Hallinger, 2020).

This study utilised a comprehensive search strategy focusing on the convergence of tourism and the digital economy, encompassing title, abstract, author keyword, and keywords. After examining past research in different fields (Aidi Ahmi, 2019; Kent Baker et al., 2020), the search string was created. Research in the current literature has primarily utilised samples from the population of interest and tends to concentrate on specific disciplinary areas or individual institutions (Abramo et al., 2009), therefore this study focuses on a specific area within the tourism and digital economy. Prior to performing the quantitative analysis, a thorough review of all publications was carried out to identify any discrepancies or duplications to maintain data accuracy (Wider et al., 2023). There were 594 articles found between 2001 and early 2023 that covered various categories including Business Management, Social Science, Computer Science, Engineering, Economics, Econometrics-Finance, and Environmental Science.

Results

Examining document types, annual publication rates, language preferences, research topics, key terms, publication distribution by country, author contributions, and citations, the collected data was analysed. Most of the results are displayed as percentages and frequencies. We analyse the data using data visualisation tools, graphs, and raw data.

Document Types

The type of document was initially determined by analysing the gathered data. Articles, book chapters, and conference papers are different types of documents. Conference papers are summaries of presentations delivered at conferences that may have been expanded into complete journal articles. This study identified ten distinct categories of published materials related to tourism and the digital economy: Conference papers, articles, book chapters, editorials, notes, press pieces, book reviews, and book reviews. In [Table 1](#), articles made up 48.99% of publications, followed by conference papers at 24.75%. The other types of documents accounted for less than 10% of all documents, totalling approximately 15%. Editorials, letters, erratum, and notes had the lowest percentages, all less than 5%.

Table 1: *Document Type.*

Document Type	Frequency	% (N=594)
Article	291	48.99
Conference Paper	147	24.75
Book Chapter	76	12.79
Conference Review	45	7.58
Book	18	3.03
Review	9	1.52
Editorial	4	0.67
Letter	2	0.34
Erratum	1	0.17
Note	1	0.17
Total	594	100.00

Source: Proposed by author (2023)

Year of Publications

The first study focusing on tourism and the digital economy was released in 2012 by [Kamel and El Sherif \(2001\)](#) in their publication titled, “The role of small and medium-sized enterprises in developing Egypt's tourism industry using e-commerce”. Between 2011 and 2017, there was a significant rise in the number of pertinent articles. It is worth noting that there was a significant increase between 2018 and 2023, as shown in [Figure 1](#). There is an expectation of an increase in publications in 2023 compared to previous years, as indicated in [Figure 1](#). The data is presented in [Table 2](#).

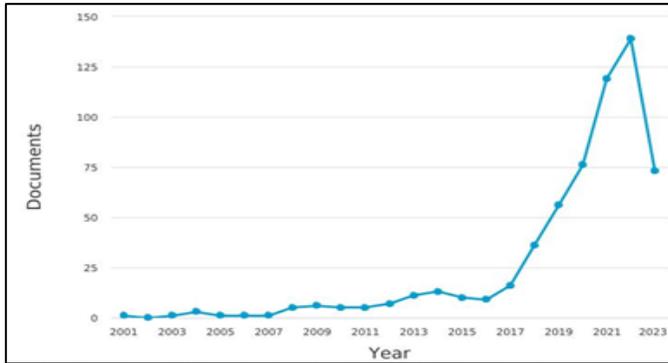


Figure 1: Publications Produced by Year.

Source: Elsevier.com (2023)

Table 2: Percentage Breakdown of Publication by Year.

YEAR	Frequency	% (N=594)	Cumulative Percentage
2001	1	0.17	0.17
2003	1	0.17	0.34
2004	3	0.51	0.84
2005	1	0.17	1.01
2006	1	0.17	1.18
2007	1	0.17	1.35
2008	5	0.84	2.19
2009	6	1.01	3.20
2010	5	0.84	4.04
2011	5	0.84	4.88
2012	7	1.18	6.06
2013	11	1.85	7.91
2014	13	2.19	10.10
2015	10	1.68	11.79
2016	9	1.52	13.30
2017	16	2.69	15.99
2018	36	6.06	22.06
2019	56	9.43	31.48
2020	76	12.79	44.28
2021	119	20.03	64.31
2022	139	23.40	87.71
2023	73	12.29	100.00
Total	594	100.00	

Source: Proposed by author (2023)

Languages of Documents

In Table 3, it is evident that most of the studies (over 95%) were published in English (90.29%). Meanwhile, 2.55% of the studies were published in Spanish, 1% in Chinese,

and 1% in Russian. Among the publications analysed, German, Catalan, African, and Slovenian had the lowest usage rates.

Table 3: *Languages Used for Publications.*

English	566	95.13
Spanish	14	2.35
Chinese	4	0.67
Russian	4	0.67
Italian	3	0.50
Afrikaans	1	0.17
German	1	0.17
Slovenian	1	0.17
Catalan	1	0.17
Total	594	100.00

Source: *Proposed by Author (2023)*

Subject Area

Table 4 presents the classification of the published works according to their respective subject areas. The classification presents a wide range of topic fields such as business management, social science, computer science, engineering, economics, econometrics, finance, and environmental science. Studies indicate that the intersection of tourism and the digital economy ranges from 20% to almost 41%. Accounting and business management account for more than half of the publications analysed (39.36%), with social science in second place (36.17%).

Table 4: *Subject Area.*

Subject Area	Frequency	% (N=564)
Business, Management and Accounting	222	39.36
Social Sciences	204	36.17
Computer Science	177	31.38
Engineering	124	21.99
Economics, Econometrics and Finance	120	21.28
Environmental Science	107	18.97
Earth and Planetary Sciences	49	8.69
Decision Sciences	48	8.51
Energy	43	7.62
Mathematics	39	6.91
Arts and Humanities	28	4.96
Materials Science	16	2.84
Physics and Astronomy	16	2.84
Medicine	13	2.30
Agricultural and Bi Sciences	10	1.77
Others	24	4.25
Total	594	100.00

Source: *Proposed by author (2023)*

Keywords

Quantitative networks were created and displayed using VOS viewer in this section. This section of the research concentrated solely on the specific terms (refer to [Figure 2](#)). Displaying maps can involve using visualisation methods like density maps or network visualisations, which show specific characteristics using different attributes ([Sweileh et al., 2017](#)). Similar terms are shown in proximity and with matching colours. Keywords related to tourism, the digital economy, sustainable development, sharing economy, COVID-19, digital storage, economics, Airbnb, and digital technologies were the most frequently mentioned in the study (refer to [Table 5](#)). It is intriguing to note that according to the visualisation in [Figure 3.0](#), recent research has concentrated on topics like COVID-19, the sharing economy, China, digitization, and the digital economy. Here is the overlay visualisation shown in [Figure 3](#).

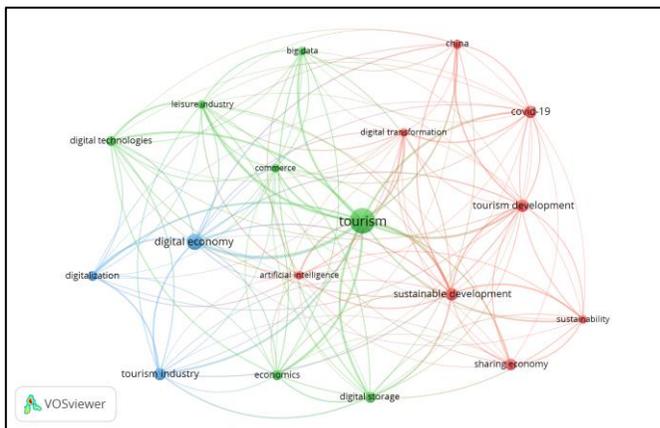


Figure 2: Network Visualization Map Derived from Author Keywords.
Source: Proposed by author (2023)

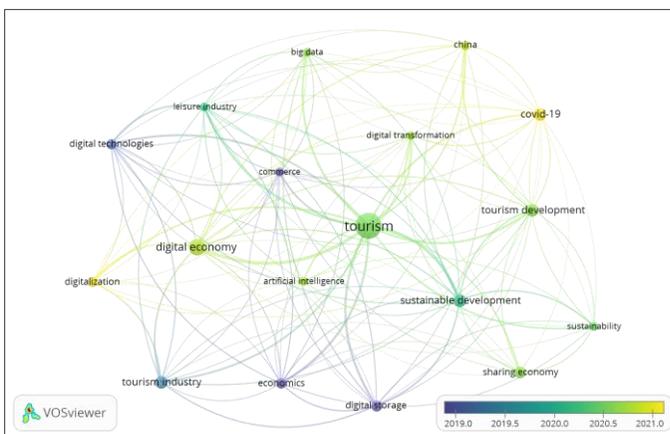


Figure 3: Overlay Visualization Map Derived from Author Keywords.
Source: Proposed by author (2023)

Table 5: *Keywords.*

Tourism	163	9.36
Digital Economy	68	9.36
Tourism Industry	41	9.36
Sustainable Development	39	9.36
Tourism Development	39	9.36
Sharing Economy	35	9.36
COVID-19	34	9.36
Digital Storage	31	9.36
Economics	28	9.36
Airbnb	27	9.36
Digital Technologies	26	9.36

Source: *Proposed by author (2023)*

Geographical Distribution of Publications

According to [Table 6](#), scholars from various countries have conducted research on the intersection of tourism and the digital economy. China was the leading country with 93 documents, followed by Russia with 55 and Spain with 49.

Table 6: *Countries Contribution to Publications.*

Country	Frequency	% (N-783)
China	93	11.88
Russian Federation	55	7.02
Spain	49	6.26
United Kingdom	40	5.11
United States	36	4.60
Indonesia	31	3.96
Australia	29	3.70
Italy	28	3.58
Portugal	20	2.55
Malaysia	19	2.43
Thailand	19	2.43
Greece	17	2.17
India	17	2.17
Others	330	42.25
Total	783	100.00

Source: *Proposed by author (2023)*

Number of Authors

[Table 7](#) displays the number of authors for each document. Out of the total, 126 (7.62%) were authored by a single person, with the remaining 1527 (92.38%) being collaborative publications. There are between one and forty-five writers in total.

Table 7: Author(s) Count per Document.

Author Count	Frequency	% (N=1653)
1	126	7.62
2	262	15.85
3	363	21.96
4	312	18.87
5	240	14.52
6	114	6.90
7	63	3.81
8	40	2.42
9	9	0.54
10	20	1.21
11	11	0.67
12	12	0.73
14	14	0.85
22	22	1.33
45	45	2.72
Total	1653	100.00

Source: Proposed by author (2023)

Citation Analysis

The citation metrics for the publications as of July 30, 2023, are presented in [Table 8](#). The table displays the total number of citations and the average number of citations per year for the publications. During the period from 2001 to 2023, a total of 594 articles were amassed, receiving 3,835 citations, with an average of 174.32 citations per year. [Table 9](#) lists the top 20 publications (arranged by number of citations) they have received. In addition to the total Scopus citations, the table also displays the total Google Scholar citations. The publication "Conceptual foundations for understanding smart tourism ecosystems," authored by [Gretzel et al. \(2015\)](#), has garnered the highest number of references up to now (399 citations, or an average of 49.88 citations per year).

Table 8: Citation Metrics.

Metrics	Data
Reference date	30/07/2023 12:15:00
Publication years	2001-2023
Citation years	22 (2001-2023)
Papers	594
Citations	3835
Citations/year	174.32
Citations/paper	6.46
Citations/author	1659.37
Papers/author	266.82
Authors/paper	2.69
Age-weighted citation rate	1215.94
Hirsch h-index	37
g-index	50

Source: Proposed by author (2023)

Table 9: Most Cited Articles.

No.	Authors	Title	Year	Cites	GS Rank	Cites Per Year
1	U. Gretzel, H. Werthner, C. Koo, C. Lamsfus	Conceptual foundations for understanding smart tourism ecosystems	2015	399	575	49.88
2	A. Grêt-Regamey, P. Bebi, I.D. Bishop, W.A. Schmid	Linking GIS-based models to value ecosystem services in an Alpine region	2008	158	591	10.53
3	T. Pencarelli	The digital revolution in the travel and tourism industry	2020	152	378	50.67
4	S. Gössling, C. Michael Hall	Sharing versus collaborative economy: how to align ICT developments and the SDGs in tourism?	2019	140	440	35
5	M. Cheng, C. Foley	The sharing economy and digital discrimination: The case of Airbnb	2018	114	473	22.8
6	E. Custodio, J.M. Andreu-Rodes, R. Aragón, T. Estrela, J. Ferrer, J.L. García-Aróstegui, M. Manzano, L. Rodríguez-Hernández, A. Sahuquillo, A. del Villar	Groundwater intensive use and mining in south-eastern peninsular Spain: Hydrogeological, economic, and social aspects	2016	77	587	11
7	K.R. Kunzmann	Smart Cities After Covid-19: Ten Narratives	2020	74	347	24.67
8	A. Vargas-Sánchez, M. Moral-Moral	Halal tourism: state of the art	2019	71	499	17.75
9	S.B. Hojegah, A.N. Esfangareh	Digital economy and tourism impacts, influences and challenges	2011	69	582	5.75
10	A.O.J. Kwok, S.G.M. Koh	Is blockchain technology a watershed for tourism development?	2019	68	446	17
11	N. Akhtar, N. Khan, M. Mahroof Khan, S. Ashraf, M.S. Hashmi, M.M. Khan, S.S. Hishan	Post-covid 19 tourisms: Will digital tourism replace mass tourism?	2021	67	277	33.5
12	A. Adukaite, I. van Zyl, Ş. Er, L. Cantoni	Teacher perceptions on the use of digital gamified learning in tourism education: The case of South African secondary schools	2017	66	571	11

13	S. Gössling	Tourism, technology, and ICT: a critical review of affordances and concessions	2021	58	370	29
14	P. Tarolli, S. Calligaro, F. Cazorzi, G. Dalla Fontana	Recognition of surface flow processes influenced by roads and trails in mountain areas using high-resolution topography	2013	57	527	5.7
15	F. Paul, M. Maisch, C. Rothenbühler, M. Hoelzle, W. Haerberli	Calculation and visualisation of future glacier extent in the Swiss Alps by means of hypsographic modelling	2007	55	517	3.44
16	L. Wei, S. Ullah	International tourism, digital infrastructure, and CO2 emissions: fresh evidence from panel quantile regression approach	2022	51	119	51
17	T. Aguilera, F. Artioli, C. Colomb	Explaining the diversity of policy responses to platform-mediated short-term rentals in European cities: A comparison of Barcelona, Paris, and Milan	2021	51	253	25.5
18	S. Gössling	Technology, ICT and tourism: from big data to the big picture	2020	47	336	15.67
19	M. Cheng, C. Foley	Algorithmic management: The case of Airbnb	2019	44	489	11
20	M. Watkins, S. Ziyadin, A. Imatayeva, A. Kurmangalieva, A. Blembayeva	Digital tourism as a key factor in the development of the economy	2018	42	479	8.4

Source: Proposed by author (2023)

4. Conclusion

The significant growth of the Internet and e-commerce is closely associated with the advancement of tourism and the digital economy. Researchers have focused on investigating issues concerning the digital economy and tourism due to their significance. The research conducted a quantitative bibliometric analysis of all scholarly literature on this topic to date. This study built upon previous research by utilising important quantitative measures from the Scopus database. A total of 594 publications were collected from the Scopus database. According to the results, 95% of the articles retrieved were in English. In addition, more than 71% of documents are written by two or more authors, with only 8% of documents having a single author. Moreover, the data indicates an increase in authorships per document over time. China had the highest number of contributing writers, with Russia and Spain following closely behind. Several Asian and European countries have released research that has had a significant influence on this field.

Various academic fields, such as business management, social science, computer science, engineering, economics, econometrics/finance, and environmental science, have expressed interest in studying tourism and the digital economy. Interest levels vary from 20% to nearly 41% across different disciplines. Around 75% of the documents that were reviewed belong to the social science and business management fields. From 2017 onwards, there has been a notable rise in publications focusing on tourism and the digital economy. According to this analysis, there has been a noticeable increase in the average number of authors per document over time, corresponding to the rising annual frequency of publications. As a result, it could be stated that collaboration among authors in this field is on the rise. Despite these significant findings, there are still other limitations. Firstly, the dataset contains published work from 2001 to the beginning of 2023; it does not include later works. Furthermore, solely the Scopus database is utilised in this study. Furthermore, other analyses were not considered, like co-authorship.

It's important to mention that this study used specific terms to identify the academic publications listed in Scopus. Prior studies on bibliometric analysis have utilised this method (Meschede, 2020). Categorising the selected articles correctly is a vital consideration. Mistakes regarding the data source, like author and institution names, could arise in this regard. Consequently, it may affect the efficiency of providing authorship and affiliation details. This study was one of the pioneering works to investigate bibliometric indicators related to tourism and the digital economy, despite some limitations. The study supported previous research results in the management field, specifically focusing on growth and authorship trends (Donthu et al., 2020).

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