

BRAIN. Broad Research in Artificial Intelligence and Neuroscience

e-ISSN: 2067-3957 | p-ISSN: 2068-0473

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2024, Volume 15, Issue 4, pages: 265-282.

Submitted: September 12th, 2024 | Accepted for publication: November 9th, 2024

The Impact of Artificial Intelligence (AI) and Digitalisation in Tourism Vocational Education

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Abstract: Artificial intelligence, digitalisation, and other variants of modern technology have been a central topics in the tourism sector in recent times. A bibliometric study investigated the impact of artificial intelligence and digitalisation in tourism education. a total of 1,911 published documents between years 2000 to 2023 were retrieved from the Scopus database. The study highlighted the evolving volume of studies on artificial intelligence applications in tourism education and the tourism sector by considering, authors and authorship networks, date of publications, countries, journal publications, citation count, research themes, keywords, and keyword co-occurrence. This evolution in the citation count and number of publications over the years is a pointer to the increasing attention on artificial intelligence generally and then on its role in tourism education and by extension tourism industry. Beyond the dates and citation count, the study reveals countries with the most publications in line with the theme of the study. To this end, China was shown to have more publications emanating from there. In terms of authorship, "Law Rob" and Ivanov Stanislav were shown to have made noteworthy contributions to the topic of consideration. The co-occurrence analysis carried out to identify key theme areas showed notable word cloud formation for terms such as "artificial intelligence", "tourism" "education" "digitalisation" and "tourism industry". The study concludes that more studies will be required in other to get the most out of the integration of artificial intelligence and digitalisation in tourism education.

Keywords: artificial intelligence; education; tourism; tourism vocational education; digitalisation.

How to cite: Aigbokhai, G., Bahcelerli, N. M., Akyurek, S., Altinay, M., & Keneybayeva, A. (2024). The impact of artificial intelligence (AI) and digitalisation in tourism vocational education. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 15(4), 265-282.
<https://doi.org/10.70594/brain/15.4/18>

1. Introduction

The utilisation of digital technology for teaching students is commonly known as digitalisation in the field of education. Digitalisation is considered a crucial concept for achieving the goals of Industry 4.0 and preparing for the future. Industry 4.0 and digitalisation are intricately interconnected ideas. Education 4.0 encompasses several important elements, including peer-to-peer learning, the development of critical thinking skills, the use of automated assessment methods, advanced data analytics, and personalised learning. The fourth industrial revolution, also known as digital transformation, is distinguished by the assimilation of individual skills and developments in technology. The integration of different online contexts has been facilitated by technological improvements, resulting in hybridised learning that combines both traditional and virtual environments. The flipped classroom, digital cooperative learning (DCL), gamification, augmented reality, virtual reality, artificial intelligence (AI), and mixed reality have become increasingly popular in education as a result of the digital transformation (Mikalef & Gupta, 2021).

As essential as it is to mention the role of digitalisation in tourism education, it is also pertinent to acknowledge the irrefutable impact of digital technology, particularly in the tourism business, as a primary driver of innovation within the sector. Travellers can effectively personalise their experiences and obtain additional benefits thanks to digital technology. This is especially true in terms of trip planning, making informed decisions, and navigating on-site. Furthermore, it improves their experiences in particular service and destination contexts, and more crucially, it makes it easier for them to share these experiences with other people (Lučić, 2022). According to Dexeus (2019), the utilisation of technology in the tourist business has brought about a substantial transformation in the trip experience. This transformation encompasses the stages of planning, while the trip is being taken, and even after the trip has come to an end.

Artificial Intelligence (AI) has had a substantial impact on a variety of aspects of higher education, including the utilisation of data-driven assessments to evaluate students' engagement with course material, the implementation of adaptive testing methods, and the utilisation of automated grading systems (Swiecki et al., 2022). In addition, artificial intelligence has been employed in the development of assessment tasks that incorporate AI-assisted writing. This is a programme that is available to the general public and utilises both natural language processing (NLP) and artificial intelligence in order to generate written content (Lund & Wang, 2023).

As important as digitalisation is in tourism education, digital technology has a big impact on the tourism sector and drives innovation, especially in tourism companies. Digital technology enables travellers to customise and obtain benefits. This applies especially to journey planning, selection, and navigation. Additionally, it enhances service and destination experiences and facilitates sharing (Lučić, 2022). Tourism technology has revolutionised the vacation experience; according to Dexeus (2019), it considers planning, travel, and recovery.

Tourism education needs radical changes to survive. Before working in tourism, pupils need ICT skills. Teaching and learning the profession is easier with technology (Hsu, 2018). Virtual worlds for Web 3D simulation in tourist education aid strategic tourism learning, according to Hsu (2018). D'Cruz et al. (2023) say virtual worlds teach students about tourism, raise self-confidence, and improve communication and social skills.

The principal aim of this study is to perform a bibliometric analysis of research articles that explore the effects of artificial intelligence (AI) and digitalisation on tourism vocational education. Specifically, the study will focus on the benefits and drawbacks of these developments, as published in the Scopus database, which covers the years 2000 to 2023. Based on research on artificial intelligence (AI) and the digitalisation of education (tourism vocational education), the following research problems were addressed:

Q1. How has research on the impact/effect of artificial intelligence (AI) and digitalisation on tourism and tourism education evolved?

Q2. What are the key theme areas investigated in the literature regarding the impact of artificial intelligence and digitalisation in tourism education and tourism?

Q3. Who are the most significant authors of studies on the effect of artificial intelligence in tourism education?

Q4. According to the journal of publishing, how is the distribution of research?

2. Significance of Research

By conducting an inquiry into the implications of digitalisation and AI in education, specifically in the field of tourism vocational education, the primary objective of this study is to provide a viewpoint on the role that artificial intelligence (AI) plays in education and how it may have an impact on the tourism industry. To accomplish this, a synopsis of the body of literature that is currently available is compiled, gathering information from a wide variety of academic disciplines and points of view. The outcomes of the research will, in essence, provide a clearer picture of the trends in artificial intelligence research in education. They will shed light on the areas that have garnered the most attention and provide additional recommendations for future studies in the field.

3. Digitalisation and AI Implication in Tourism Education

The rapid development of artificial intelligence technology has led to an increase in the prevalence of the use of "Artificial Intelligence in Education (AIED)" and its deployment in numerous educational settings. There is a substantial and far-reaching impact that artificial intelligence has on the educational system. There is currently a paradigm change taking place in the field of education, where the old model of knowledge transmission that is centred on problem-solving is being replaced with an approach that emphasises creative convergence. The collective paradigm of public education, which was developed during the industrial period, is being replaced by a customised education system that is driven by artificial intelligence. All aspects of education, including its goals, its content, and its delivery style, are experiencing the process of change simultaneously. At the same time, the field of artificial intelligence is bringing about a revolution in the approaches that are utilised in the sector of education. In this day and age of highly advanced artificial intelligence, there is an immediate need for an in-depth investigation into the educational system (Çinar, 2020).

As a result, it is of the utmost importance to determine the influence that artificial intelligence has on the field of education and to investigate these implications in great detail. The importance of thoroughly defining and resolving significant matters cannot be overstated, especially in light of the growing number of AIED research articles that have been published. A great amount of research has been conducted to study the difficulties that are connected with incorporating AI into the settings of educational institutions. These studies, on the other hand, have a limited viewpoint on bibliometric analysis because they focus on particular disciplines such as higher education and special education. As a result, it is of the utmost importance to carry out systematic study in order to acquire a full understanding of the research patterns in AIED within the framework of training and comprehending how AI functions in general- its advantages and disadvantages (Paek & Kim, 2021).

Tourism education has evolved significantly, and in the last decade, the focus of both researchers and professionals has increased towards digital innovations that have come about in the rapidly changing information society (Stephchenkova et al., 2012). Every corporate environment is characterised by internet technology, globalisation of the global economy, and the creation of new principles geared towards sustainable growth. Digital technologies and the Internet economy have a significant impact on the tourism industry (Minghetti & Buhalis, 2010). Simultaneously, digital advances might be a major factor in the tourism industry's radical transformation between 2010 and 2030. Morellato (2014) posits that, like other students, those studying tourism possess a wealth of knowledge and are accustomed to digital gadgets, electronic media, and social networking. However, it is important to encourage educational institutions and business communities to make investments in digital competency training that encompasses technological, cognitive, and ethical

levels. Additionally, it is important to raise awareness of issues pertaining to social and legal themes, such as copyright, privacy, and licensing. Morellato (2014) further posits that Students studying tourism should become proficient in using the communication tools that are available in today's information-rich society. They should also become aware of the risks associated with gathering and storing personal data as well as the opportunities that technology presents for positive social interaction. By utilising learning platforms in the classroom, educators can encourage students to participate in collaborative networks. This can lead to conversations on the moral and legal implications of the "Net" and, in the long run, help students develop the inter-organisational networks that are essential to the tourist sector.

4. AI in Tourism Education: Cognitive and Behavioral Perspectives

As a co-factor in developing human potential, AI is seen as a potential intellectual partner to enhance the emotional, behavioural, and cognitive capacities of learners and groups. AI can push the limits of students' knowledge and abilities and apply machine learning to user characteristics and activity data to make personalised recommendations that suggest the next best thing (Pea, 2014). AI can do this by making them pay attention to things they have not noticed before, it can also elicit new ideas and observations, or the student can let the AI discover something new and share it (Rodrigues et al., 2022; Dickler et al., 2021).

In the stage of integrating the new with the known, AI can provide information for learner-centred learning analysis to meet the needs of learners. It enables one to see where one stands to others and one's background, or to identify current goals and paths to follow. The deep and superficial learning strategies used by the learner of YZ can be detected (Gasevic vd., 2017). Another approach for the assimilation of YZ and future adaptation is to provide visualised model-based feedback (Gibson vd., 2023). AI will contribute to the matching of individual competencies with task requirements by taking advantage of the strengths of the person, and his/her interests and desires with shared objectives or problems-like task conditions (Sagar, 2020).

This ensures huge potential in the application of artificial intelligence in tourism education, for cognitive development and deepening the learning process of students. For example, AI-based tools can be developed to support adaptive learning processes, whereby teaching content is made to adapt to the progress and comprehension of the student. With this approach, participation increases, but more importantly, it also enhances each student's memorable effect with his/her learning style, allowing reviewing complicated topics or expanding strong points of skills (Alkhatlan ve Kalita, 2018; Arslan, 2020).

In critical thinking, AI-supported simulations and scenario-based education provide students with virtual, real-world challenges in tourism crisis management or customer service scenarios, for instance (Neri et al., 2021). Students develop analytic skills through interaction with these simulated experiences and learn how to make complex decisions, thereby enhancing their skills in critical thinking. Adaptive AI could also engage students in different problem-solving strategies and encourage them to think strategically and consider a range of options for outcomes (Abdurrahman et al., 2021).

Artificial intelligence further provides memory-enhancing tools, such as algorithms for spaced repetition, which optimise when and how often students revisit information based on neurobiologically grounded learning intervals (Halkiopoulous & Gkintoni, 2024). Such a structured approach may have a positive effect on the long-term retention of information, especially in areas like tourism, where details of customer interactions, cultural identities, or geographical knowledge are important. With the integration of AI in tourism education, students will acquire not only technical knowledge but also cognitive skills in an industry that is highly dynamic and interactive; something which is of paramount importance for future careers (Chatterjee, 2020; Abdurrahman et al., 2021).

5. Methodology

5.1. Research Design

Research techniques in some cases might be quantitative or qualitative, in which case impacts the approach to data collection. However, for this research, a descriptive approach with a quantitative research technique was employed. In order to bolster your aims and provide a solution to your research issue or questions, the majority of research projects in the fields of business and management will either include numerical data or hold data that can be quantified appropriately. Bibliometric methodology refers to the use of quantitative methodologies, such as citation analysis, to analyse bibliometric data, which includes units of publishing and citation. The inception of bibliometrics in the 1950s suggests that the methodology is not novel. Nevertheless, the utilisation of bibliometrics in the fields of "business, management, and accounting," "economics, econometrics, and finance," and "social sciences" on Scopus, with "bibliom*" as a term in the "article title, abstract, and keywords," suggests that bibliometrics remains a relatively recent development. Specifically, the number of bibliometric publications has shown a consistent upward trend, with an average of 1021 papers published in the last decade. This development could perhaps be associated with the proliferation of scientific research in a broader sense (Donthu et al., 2021). Furthermore, an indication of the multidisciplinary element of the topic is the implementation of the bibliometric technique, which derives from the information science discipline, in the realm of business research. Throughout the previous half-century, applications of bibliometric approaches have been successfully implemented in a variety of commercial areas, including management and industrial/organisational psychology. However, for this study, the VOSviewer and Excel were employed for the needed analysis. This is in addition to their application in the social sciences (Guiling et al., 2022).

The fundamental concepts of production and impact are the foundation of bibliometrics. These concepts are evaluated through publications and citations found in the literature. In a manner that is both objective and quantifiable, it makes it possible to evaluate the significance of certain people, publications, or research groups (Ebrahim, 2016).

5.2. Data Collection

Data collection was done using the Scopus database. Scopus is a comprehensive database that contains curated abstracts and citations. It includes a wide variety of scientific journals, conference proceedings, and books, and it offers comprehensive coverage on a global and regional scale. All of the data that is indexed is of the highest possible quality because of the stringent procedures that are used for content selection and re-evaluation. An independent content selection and advisory board is in charge of overseeing this method during its execution. Every single data item is meticulously monitored and improved by Scopus through the implementation of stringent quality assurance methods. Scopus is a database that not only provides enhanced metadata records for scientific papers, but it also provides detailed profiles of authors and institutions (Burnham, 2006).

To ensure a high level of accuracy and completeness, the profiles are built by employing sophisticated profiling algorithms and thorough curating. Scopus is frequently used as a reliable source of bibliometric data for comprehensive analysis in research evaluations, university rankings, research landscape studies, and policy evaluations. This is because Scopus has a high level of reliability. Scopus data has been freely exploited by the academic research community for specific inquiries, such as those enabled via application programming interfaces, which has resulted in a large number of articles being published. Several topics, including researcher mobility, network visualisations, and geographical bibliometrics, have been discussed in depth in these papers (Baas et al., 2020).

5.3. Data Analysis

In this section, data is analysed using a series of bibliometric variables to shed light on the impact of artificial intelligence and digitalisation on tourism education and, by extension, on the tourism industry. The selected indicators provide a methodical approach to examine the research landscape, identify influential figures, and assess the impact of research on this sector.

5.4. Data Source

The data source used in this bibliometric analysis has to do with artificial intelligence's influence on tourism education. Similarly, information was obtained from books, journals, conference proceedings, review materials, and the Scopus database. This was done to offer a balanced picture of the range of disciplines that the study's subject touches on. Within the scope of the research, the Search Strategy in Table 1, the Inclusion Criteria in Table 2, and the Exclusion Criteria in Table 3 are given.

Table 1. Search Strategy

Searching Database	Search Category	Keywords Used
Scopus	“Artificial Intelligence” OR “Digitalisation” AND “Tourism Education” OR “Tourism”	Artificial Intelligence, digitalisation, Tourism, Tourism Education.

Table 2. Inclusion Criteria

Inclusion	Rationale
Publications from 2000 to 2023	Focus on the most recent outcomes and trend progress in the field
Document Type: articles, books, book chapters, conference papers, conference proceedings, and reviews	Having access to the full range of texts and
Artificial intelligence and Digitalisation in tourism education	Systemic investigation of the impact of Artificial intelligence and digitalisation in tourism education and also by some extrapolation within the tourism industry.
Scopus Database	The database of choice for the study.

Table 3. Exclusion Criteria

Exclusion	Rationale
Non-English language articles	English has emerged as a universal language standard.
Articles that contain redundant data	Duplicate data has been ignored for repetition.

5.5. Bibliographic Data Extraction

A total of 1,981 entries were found by searching the Scopus database for Artificial Intelligence, Digitalisation, tourism, and tourism education titles, abstracts, and author keywords, 70 documents were excluded. Documents before 2000 or after 2024 and non-English documents were excluded via Scopus filters. Finally, 1,911 eligible records were left for this bibliometric analysis and were exported for analysis. Every data regarding the various categories to be analysed were downloaded as CSV files. It was also necessary to collect the whole text in order to answer the research question concerning the technique and the research gap. Researchers can evaluate research on productivity, team dynamics, the influence of citations, and investigation patterns within a certain subject area by using these factors, which form the foundation of bibliometric analysis.

6. Findings

Q1. How has research on the impact/effect of artificial intelligence (AI) and digitalisation on tourism education/tourism evolved?

The study with a fundamental objective of investigating the modern and ever-changing dynamic of the applicability of artificial intelligence and digitalisation in tourism education and by extension the tourism industry. To achieve this, bibliometric analysis of relevant research studies was conducted to chart the research path and reveal trends over time. To this end, publication and citation counts over different years were investigated to give insights into the evolution of research on the role of artificial intelligence and digitisation in tourism education and as discovered from the findings too, tourism. The table below shows the distribution of publications and citation numbers for each year:

Table 4. Distribution of Publication and Citation Count

Year	No. Of Publications	Percentage (%)	Citation Count	Percentage (%)
2023	427	22%	1156	6%
2022	372	19%	1758	9%
2021	298	15%	2763	13%
2020	206	11%	3280	16%
2019	135	7%	2953	15%
2018	82	4%	1063	5%
2017	54	3%	422	2%
2016	34	2%	337	1%
2015	27	1%	319	1%
2014	35	1%	658	3%
2013	31	1%	201	1%
2012	31	1%	234	1%
2011	67	3%	579	3%
2010	29	1%	398	2%
2009	23	1%	1035	5%
2008	23	1%	1879	9%
2007	8	0%	149	1%
2006	9	0%	170	1%
2005	5	0%	291	1%
2004	3	0%	129	0%
2003	6	0%	361	2%
2002	2	0%	52	0%
2001	1	0%	27	0%
2000	3	0%	2	0%

According to Table 4, research on the impact of artificial intelligence and digitalisation in tourism education increased exponentially between 2019 to 2023. However, it is important to point out that 2023 had 22% of the total publication. Followed closely by 2022 with 19%, 2021 (15%), 2020 (11%), and 2019 (7%). This increase in publications between 2019 to 2023, particularly the increase in 2022 (22%) indicates an increase in interest in the research field of artificial intelligence and digitalisation in tourism education and tourism. Consequently, there was also a significant increase in the citation count between 2019 to 2023. However, the drop in citation counts between 2022 to 2023 indicates that despite the observed increase in citation trend which shows an increase in the recognition of the role of artificial intelligence and digitalisation in tourism education, the dip may also point to the relevance of the subject area to researchers within the past two years.

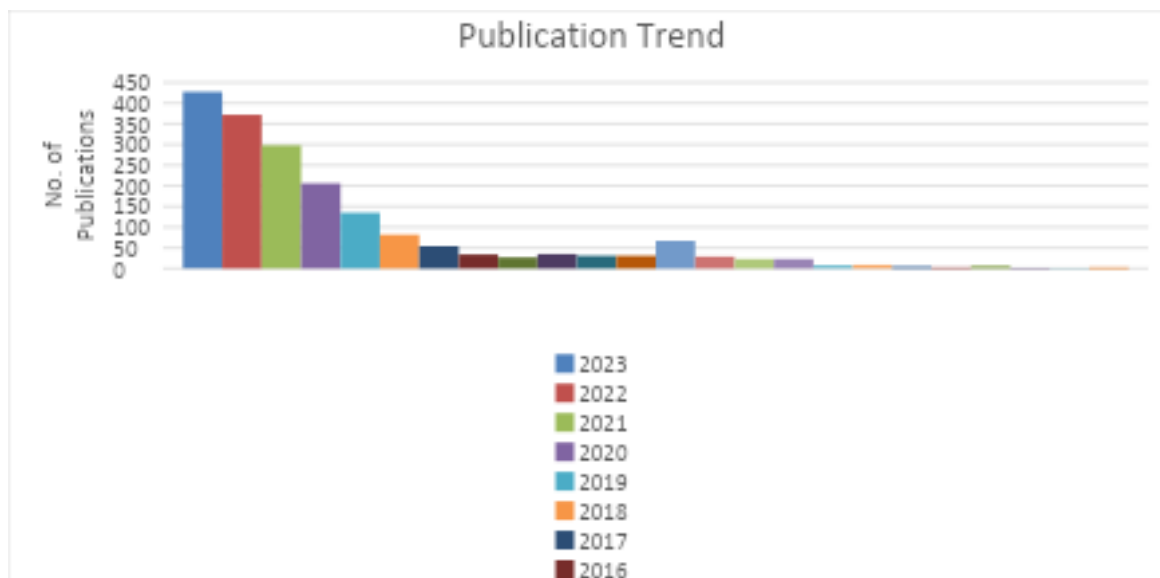


Figure 1. Publication Trends

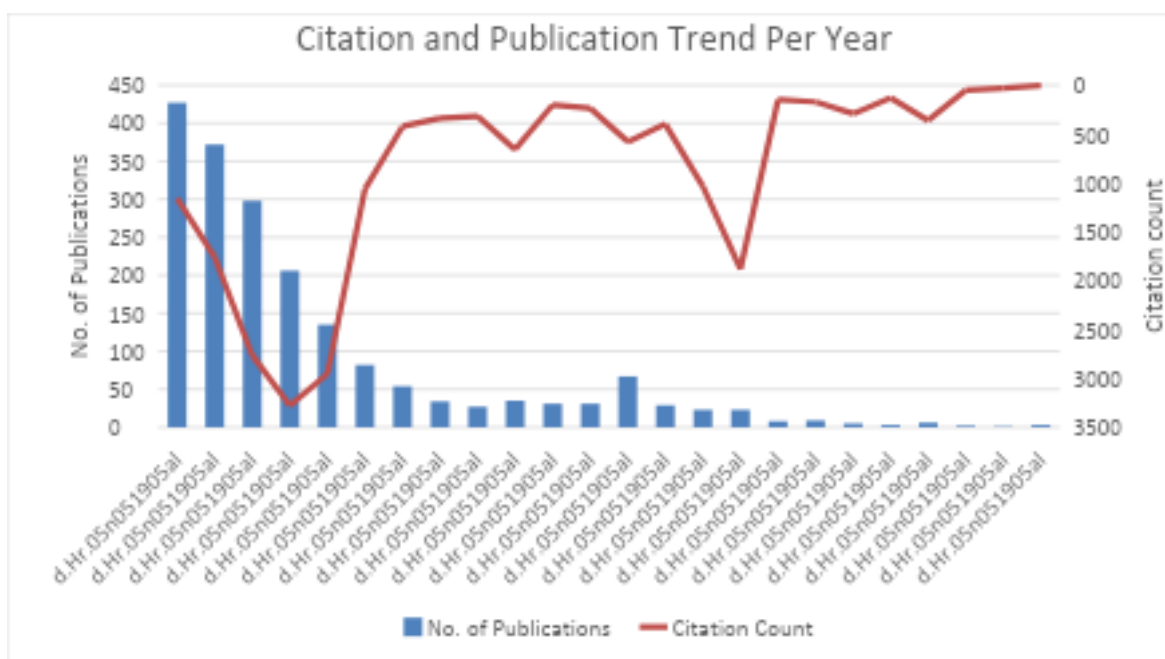


Figure 2. Comprehensive Graph of Citation and Publication Trend

From Figure 1 it can be observed that the publication trend tends to increase as well as the citation trend which is an indication of an increase in the relevance of the subject area which conversely leads to more publications. The highest citation count was revealed to be 3280 in 2022 while the lowest publication was found to be 2 in 2000. In a similar vein, 2023 had the highest publication shown to be 427, and the lowest publication shown to be 1 in 2001.

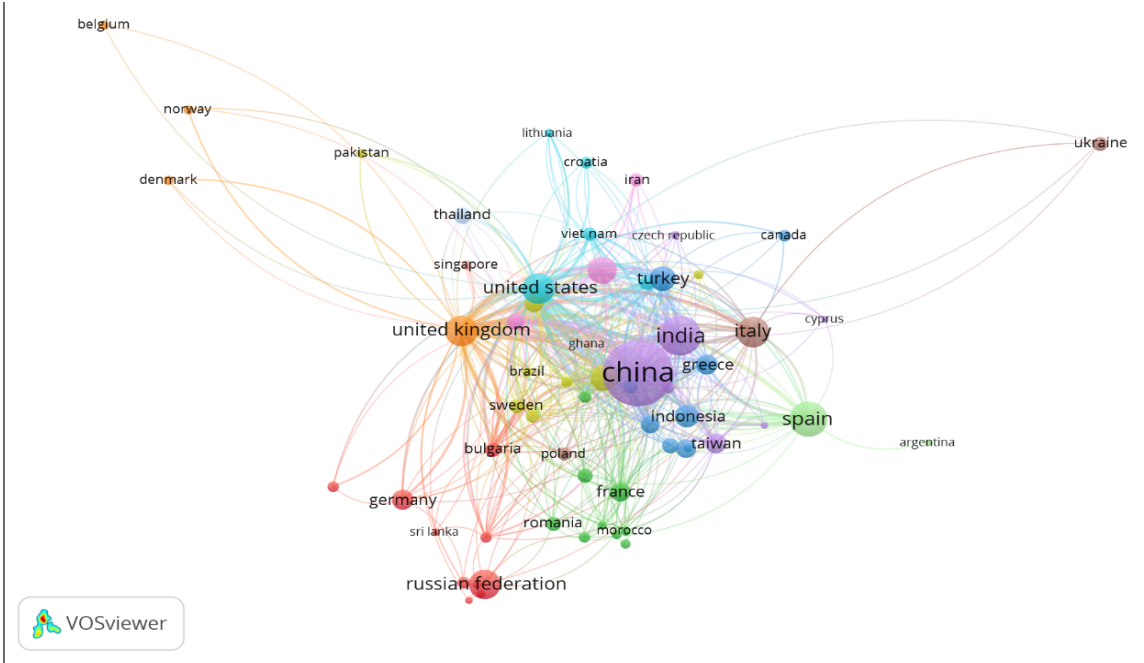


Figure 3. Presentation of Publication Per Country

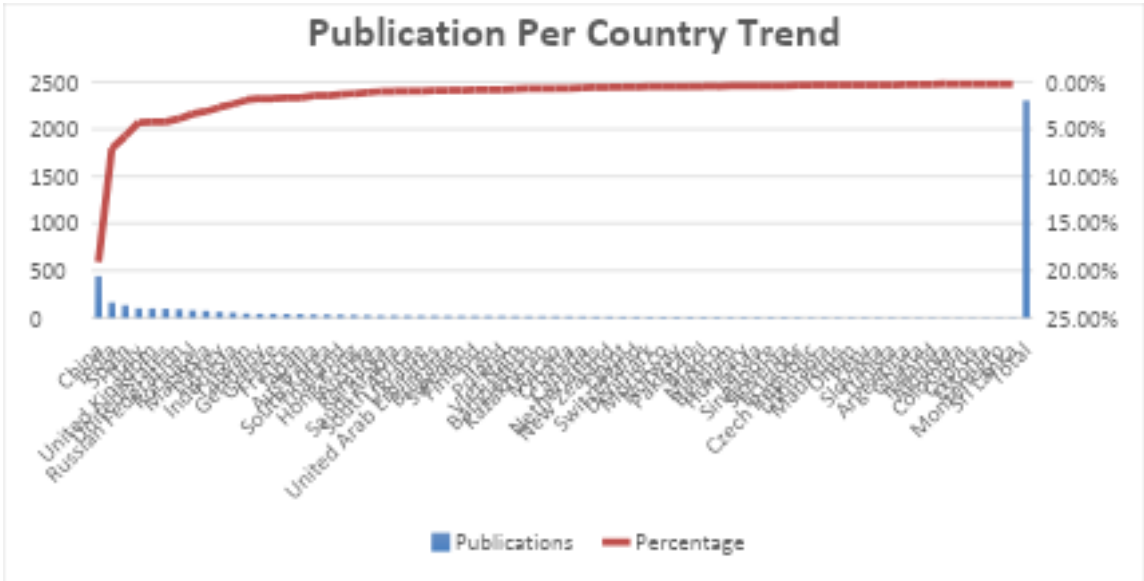


Figure 4. Publication Per Country Trend

Figures 3 and 4 give significant insight regarding the countries with the most contribution to the study topic and also show the cluster collaboration among those countries with China having a significant contribution and collaboration rate. China has the highest publication of 440, followed by India with 162 and Spain with 132.

Q2. What are the key theme areas investigated in the literature regarding the impact of artificial intelligence and digitalisation in tourism education and tourism?

Table 5. Key Theme Areas Studied

Keywords	Occurrence	Percentage
Artificial Intelligence	971	31%
Tourism	507	16%
Tourism Industry	142	4%

Digitalisation	119	3%
Big data	107	3%
Decision making	102	3%
Sustainable development	92	2%
Tourism development	89	2%
Machine learning	88	2%
Covid 19	83	2%
Smart tourism	77	2%
Learning systems	65	2%
Electronic commerce	64	2%
Tourism management	61	1%
Virtual reality	58	1%
Deep learning	53	1%
Information Management	52	1%
Internet of things	49	1%
Social media	49	1%
Digital transformation	40	1%
Tourist destinations	39	1%
Robotics	39	1%
Customer satisfaction	26	1%
Education	23	1%

Table 5 reveals the distribution of the most occurring keywords. It reveals the relative percentage literatures tend to focus on. The author's keyword is a crucial sign of the goals and preferences of the researchers for their study. The study's findings indicate that artificial intelligence accounted for a significant portion of the research, as evidenced by the fact that 31% of author keywords mentioned the topic. Tourism (16%): This could be attributed to the study's overall structure, which is fundamentally linked to tourism. Tourism is the subject of most studies, followed by artificial intelligence. Tourism Industry (4%): This percentage is indicative of the extent of research being conducted in this area. As a result, a portion of the researchers' study is focused on artificial intelligence and the tourism industry. Digitalisation (3%): This could be a sign of studies on the subject of how digitalisation affects tourism education. Big data (3%): this may have to do with the application of AI to the collection and processing of data. Making decisions (3%): this could be related to the application of artificial intelligence in tourism education to make data-driven decisions. Sustainable development (2%) can be explained by the growth of the tourism industry, which is made possible by the integration of AI and the maintenance of growth. Development in tourism (2%): this could be connected to expansion in the travel industry, which could then be connected to expansion in the travel education field. machine learning (two percent): this could entail applying artificial intelligence to tourism education through machine learning. COVID-19 (2%): as a result of the pandemic, there may be a greater use of digitalisation and artificial intelligence in the tourism industry and tourism education. Smart tourism (2%): this could include the application of contemporary technology and chatbots to travel instruction and travel in general. Learning systems (2%): this might refer to automated learning programmes used in travel instruction. Electronic commerce (2%): this may refer to the commercial use of AI in the travel industry. One aspect of tourism management (1%) is the systemic framework that is put in place to guarantee the growth of tourism and, consequently, tourism education. The percentages of virtual reality (1%), deep learning (1%), information management (1%), and the Internet of Things (1%),

among others, may be closely linked to the way that digitalisation has affected both the travel industry and tourism education.

Social media (1%): This could be related to how social media has affected the travel sector, which may imply a connection to artificial intelligence. Digital transformation (1%) could refer to the progress made in digitalisation, which could also include its use in artificial intelligence. Tourist destinations (1%): this may refer to the places where the attractions are located. Robotics (1%): this could be an extension that suggests using AI in robotics, which is primarily used in the travel sector. Customer satisfaction (1%): this may indicate that the tourism industry takes this into account. Education (1%): this could imply both the implicit and explicit connections between artificial intelligence and tourism education which may imply that academics are yet to pay enough attention to the linkage between artificial intelligence, digitalisation, and education.

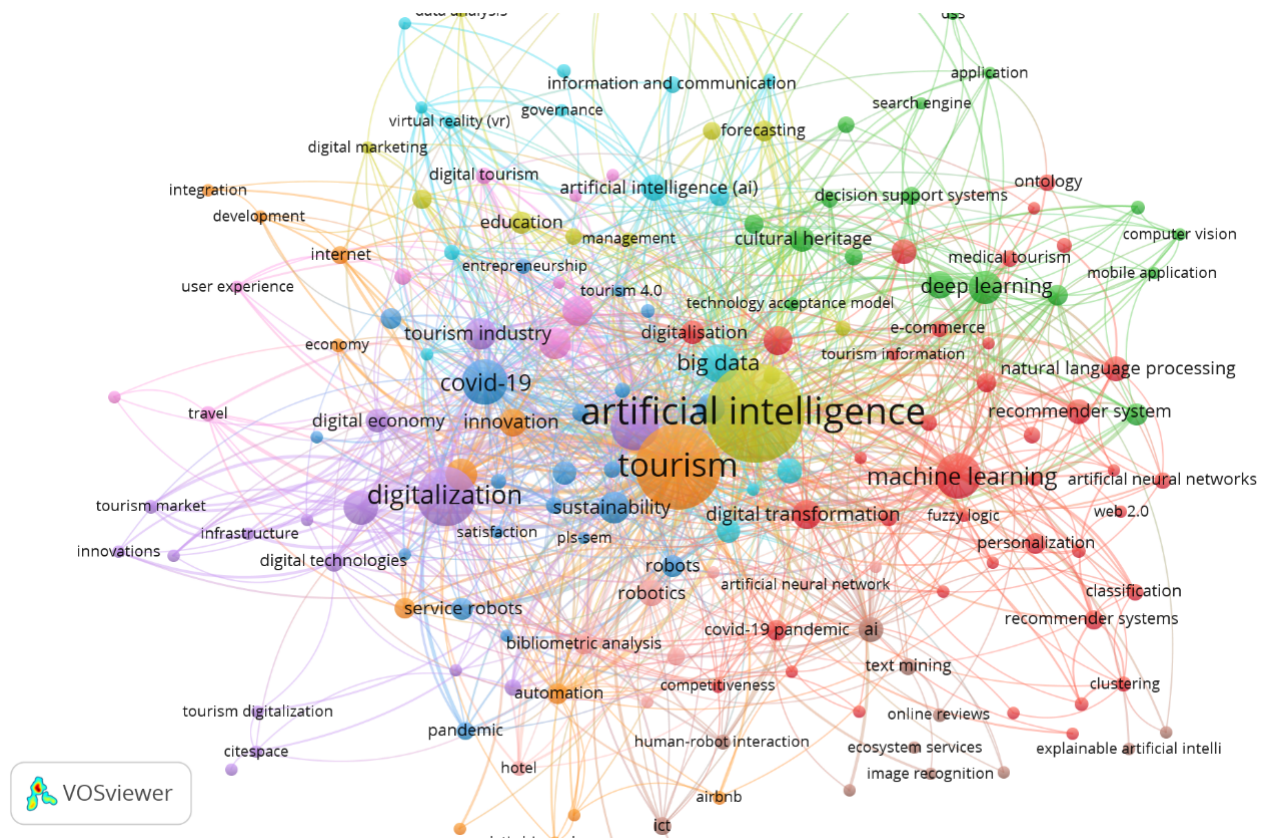


Figure 5. Visual presentation of Key Theme Areas Studied

To give a plausible answer to question two, a co-occurrence analysis of all keywords was done. This was done to visually identify the most frequently occurring phrases in the literature collection. Using the VOSviewer, the minimum number of key-words occurrence was set to 5. To this end, out of 4577 keywords, only 170 met this requirement. The bigger the keyword in the word cloud, the more frequently it appears in the dataset. Terms such as “artificial intelligence”, “Tourism”, and “Digitalisation” stand out in the word cloud which give reasonable insight to the main topics researchers have studied in depth in the literature of artificial intelligence and digitalisation in tourism education and tourism generally.

Q3. Who are the most significant authors of studies on the effect of artificial intelligence in tourism education?

Using a large collection of published works, comprehensive research was conducted on the connections between authors, the frequency of publication, and the patterns of collaboration. This activity brought together a group of authors who will have a significant impact on the narrative that

will be told about the consequences of digitalisation and artificial intelligence in the field of tourism education. The authors who produced the most work were discovered and the nature of their collaborations was also determined. This was done by conducting a detailed examination of authorship patterns. By using author networks, groups of academic communities and institutions actively involved in collaborative research were identified. The collaborative centres are driving the advancement in the research of employing digitalisation and artificial intelligence in travel and tourism education which is reflected in these clusters where the progress is being driven.

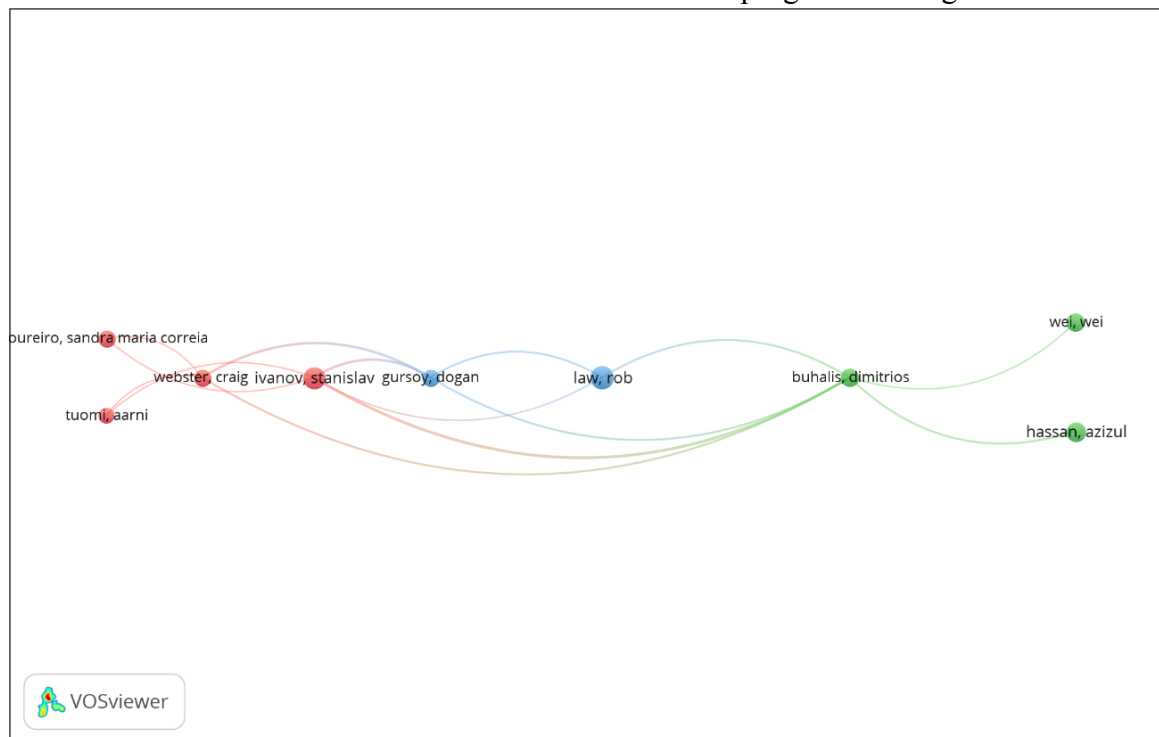


Figure 6. Co-Authorship Occurrence (Collaborative Network)

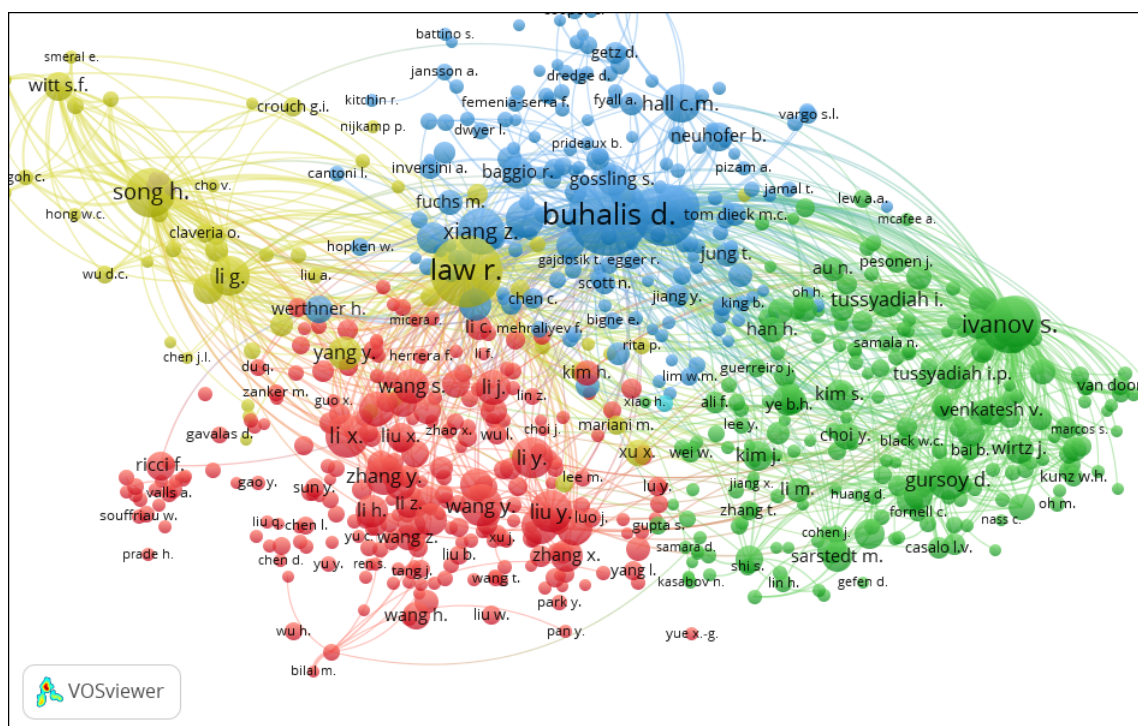


Figure 7. Most cited Author

It would appear that "Law Rob" and "Ivanov Stanislav" have made the most significant contributions as authors in terms of the number of articles they have produced. However, as can also be seen from the chart, authors such as "Buhalis Dimitrios," "Hassan Azizul," "Smimov Alexander," and "Wei Wei" have also made some contributions through the research publications that they have produced. Based on the cluster diagram provided by VOSviewer, it can be seen that "Buhalis Dimitrios" was the author who received the most citations. This is mostly because he has made significant contributions to the fields of artificial intelligence, tourism, and tourism education.

Q4. According to the journal of publishing, how is the distribution of research?

A significant amount of information regarding the dissemination of information in the field of artificial intelligence and digitalisation in tourism education is provided by the Journal of research paper publishing distribution. When looking at the data, one notices the distribution presented in the following order: Distribution of research articles among various periodicals focusing on travel and tourism education publications. According to the data presented in the table, publications that are directly related to tourism or hospitality, such as the "International Journal of Contemporary Hospitality Management" (2%), "Tourism Management" (2%), "Tourism Review" (1%), "Current issues in tourism" (1%), "Journal of Tourism Futures" (1%), and "Lecture Notes in Electrical Engineering" (1%), accounted for 11% of the total. The "ACM International Conference Proceeding Series" (5%) came in subsequent place.

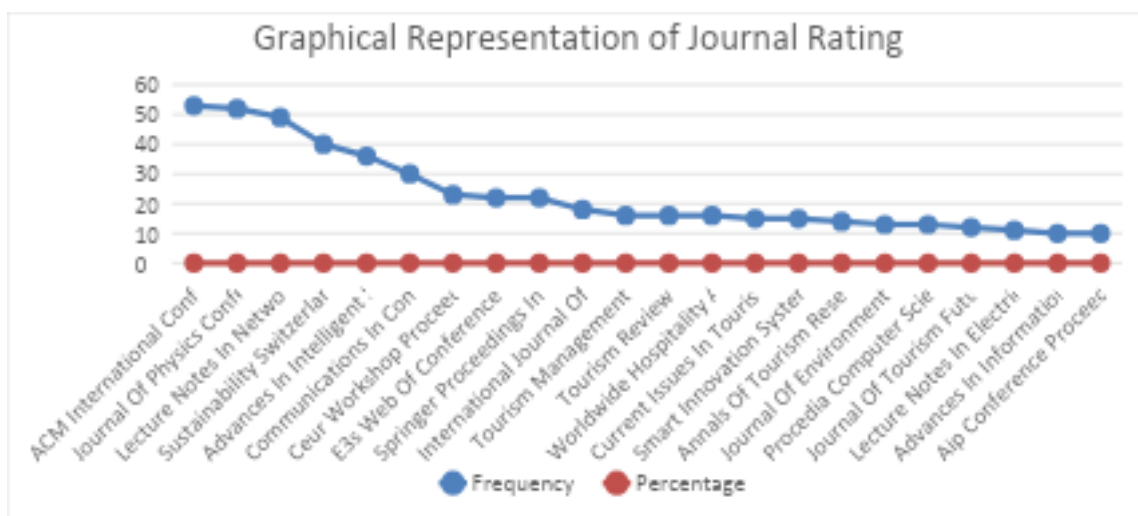


Figure 8. Graphical Representation of Journal Rating

7. Conclusion and Recommendations

When compared to the study's objectives and questions, the findings provide a thorough picture of the body of knowledge about the impact of digitalisation and artificial intelligence on tourist education.

The research on digitalisation and artificial intelligence in tourism education as a whole is showing a steady trend, according to an analysis of publication patterns conducted from the year 2000 to the year 2023. According to the findings of Knani et al. (2022), the number of publications has been steadily growing over the past few years, with a significant increase in the most recent years. A growing interest in digitisation and artificial intelligence in travel and tourism education is shown in this increase, which is indicative of the expanding interest. In addition, this trend may be observed in the number of citations, which has greatly increased over time.

AI-powered Web 3D simulation virtual worlds were utilised to research tourism education by Qiu et al. (2021). Web 2.0 enhances students' self-efficacy, communication, and tourism knowledge in tourism higher education (Qiu et al., 2021). In 2019, 2020, 2021, 2022, and 2023, papers on AI and digitalisation in tourism education and the tourism sector increased, demonstrating their expanding importance. AI and digitisation are growing in tourism and hospitality, especially education (Ivanov & Soliman, 2023).

Citations fell in 2022 and 2023 because researchers cited earlier years, and a journal takes three years to earn enough citations (Vrontis et al., 2021). The 2022 and 2023 citation losses may be attributed to artificial intelligence in tourist education demanding more practical approaches and key papers and studies with practical effects. This increase in citations shows how important AI and digitalisation are to tourist education (Çınar, 2020).

The co-occurrence analysis produced a word cloud with key terms like “Artificial intelligence” “tourism”, “digitalisation” “tourism industry”, “big data”, “decision making”, “sustainable development” “tourism development”, “machine learning”, “covid 19”, “social media”, “smart tourism” and AI has the largest cluster size in the cluster diagram, suggesting its importance, and it is linked to all key subject areas. Academics concentrated more on AI's tourism impact than tourism education. Artificial intelligence and other technologies may be used in educational tourism. In China, Nankai University's College of Tourism and Service Management excels at traditional classroom instruction, remote learning, and MOOCs with AI and digitalisation (Qiu et al., 2021).

VOSviewer's cluster diagram indicated "Buhalis Dimitrios" as the most cited author. His achievements in artificial intelligence, tourism, and tourist education are the main reasons. The study found that the writers are essential in tourist education/tourism literature on artificial intelligence and digitalisation. With 224 articles, Law Rob was the most productive tourism and hospitality researcher/author from 2001 to 2020, according to Knani et al. (2022). The author's collaborative network found that “Law Rob”, “Ivanov Stanislav”, “Buhalis Dimitrios”, “Hassan Azizul” and “Wei Wei” are prolific contributors or prominent figures in the field.

Wang et al. (2022) found tourism management in the 15 most cited publications, together with social media and online reviews, which are AI. These findings illuminate how digitalisation and AI are altering tourist education and business. This field is better understood through trends, hot themes, noteworthy authors, and publication distribution.

Within the scope of the research on the cognitive and psychological effects of artificial intelligence (AI) in the field of tourism education, the following theoretical framework and empirical findings are as follows. These frameworks provide important starting points for assessing cognitive and psychological AI effects in the field of tourism education.

- Cognitive Load Theory reflects on how educational materials can be structured concerning the limitations in the students' cognitive resources. The AI-supported systems reduce cognitive load by raising speed in accessing information about complex issues related to tourism and aiding in information processing. However, excessive presentation of information or poor suggestions of answers leads to a situation of cognitive overload. This would make it difficult for students to learn the materials and create problem situations such as inattention (Semwal vd., 2024).
- AI can present personalised training that will trigger learners to be inspired. Through adaptive learning systems, it would be easy to customise the learning material by identifying the strengths and weaknesses of the learners. For example, in the tourism industry, they can use simulations allowing learners to learn more about cultural differences and destination characteristics. Learners can thus be more inspired and happy to learn with such customisation (Dogru et. al., 2024; Bhutoria, 2022).
- The simulated lessons in VR and AI help students experience situations in tourism education that are closer to reality. A model of learning like this will help students to be more problem-solving and to recall practical knowledge. Again, these

experience-oriented AI tools have positive impacts on social and emotional abilities such as cultural sensitivity (Huang vd., 2013; Chen vd., 2022).

- Some students may think that using AI during the teaching process can threaten their psychological comfort. For example, the constant monitoring and evaluation systems of students may put them in such a condition of pressure and increase their fear of making mistakes. This may reduce students' psychological comfort and interest in learning. Therefore, ethical aspects should also be taken into consideration (Choi & Fang, 2022; Rakhmetova, 2019).

According to the findings of the study, digitalisation, and artificial intelligence are yet to be fully developed in tourism education but have seen more applicability and usage in the tourism industry as revealed by study findings. It is required to do additional study in order to have a deeper understanding of how digitalisation and artificial intelligence influence tourism education. Students will be better prepared for the hospitality and tourism industry as a result of this, which will, in turn, affect the tourism and hospitality sector.

In the long term, critical discussions on the effectiveness and scalability of AI in tourism education need to be conducted. Most studies are descriptive and more realistic challenges in such applications on a larger scale are important to investigate in single case studies, pilot programs, or small adopter groups. Furthermore, the incorporation of cognitive neuropsychology into AI-enabled learning systems is still in its infancy and more research is needed to determine its effectiveness.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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