



Digital Transformation And AI Integration In Indian Tourism Industry

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Abstract: Since the World Wide Web came into our lives, digital transformation has been constant. As the digital world evolved, customer behavior changed, too, greatly influencing the digitalization of the hotel and travel industries. People expect customer-centric experiences. They want to pick their destination with just a few clicks and get all the details about their stay, including customer service, available activities, room features, and more. This research investigates the influence of digital transformation and AI integration in tourism management experiences through systematic literature analysis. The main focus is on the availability of online booking platforms, integrating AI techniques such as virtual reality and augmented reality technology, and adopting the Internet of Things (IoT) in tourist destination management. This paper is theoretical and based on secondary data. An attempt is made through this research paper to understand the success rate or degree of digitalization that has taken place, so far, in the travel and tourism industry which is one of the chief sources of employment in any country in the world. As a comparatively nonpolluting industry, digitalization and AI integration will rake in huge revenue for a cash-starved country like India. A systematic literature review method was used to investigate global developments and the situation in India in the context of tourism digitalization with AI integration in tourism management techniques. The results of the analysis show that these factors contribute positively to tourists' travel experience, by providing easier access, more immersive experiences, and more connected facilities. However, challenges and obstacles remain, including the need for better regulation and more thorough integration of technology in tourism infrastructure.

Keywords: Digital transformation, tourism, travel experience, online booking platform, virtual reality technology, augmented reality technology, Internet of Things, systematic literature.

I. INTRODUCTION

Many countries around the world have turned the tourism industry into a key economic factor, which contributes to their economic development and helps to increase the country's GDP. The use of digitalization techniques such as information technology (IT) in the tourism industry dynamically started two decades ago, when companies started to understand and realize the tremendous impact that IT could have on the industry, through the automation of many tasks and services. Digital transformation in the tourism industry refers to the integration of technology into various aspects of the travel industry to enhance and revolutionize the overall travel experience for tourists and businesses. This transformation includes a variety of technologies and digital platforms used to simplify processes, increase accessibility, and personalize experiences.



Fig 1, e-tourism characteristics

Following is a discussion of how technology is impacting the travel experience (Pencarelli, 2020) (Cuomo, 2021):

1.1 Online Booking Platforms

The emergence of online booking platforms has made it easier for travelers to research, plan, and book their trips from the comfort of home. Platforms such as Expedia, Booking.com, and Airbnb provide a variety of accommodation, transportation, and activity options, allowing travelers to customize their itineraries based on their preferences and budget.

1.2 Mobile Apps

Mobile apps have become an indispensable tool for travelers, offering features such as real-time flight updates, navigation assistance, language translation, and local recommendations. Apps like Google Maps, Trip Advisor, discover hidden places, and make informed decisions during their travels.

1.3 Augmented Reality (AR) and Virtual Reality (VR)

AR and VR technologies are changing the way travelers research destinations and plan their trips. Through immersive experiences, travelers can virtually explore destinations, visit attractions and view accommodations before booking. The technology also enhances the on-site experience by providing interactive guides and virtual tours of landmarks and cultural sites.

1.4 Internet of Things (IoT)

IoT devices such as smart suitcases, wearable devices, and connected hotel rooms increase convenience and personalization for travelers. Smart devices enable seamless communication between travelers and service providers, enabling automatic check-in, room customization, and personalized recommendations based on preferences and past behavior.

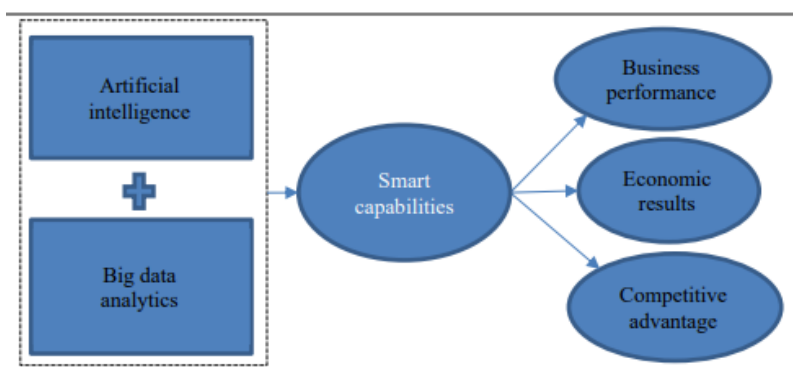


Fig2: combining AI AND big data analytics in tourism industry

1.5 Big Data and Analytics

The use of big data analytics allows travel companies to collect and analyze large amounts of data from various sources, including social media, booking platforms, and customer feedback. By leveraging this data, businesses can gain valuable insights into traveler preferences, behavioral patterns, and market trends, allowing them to adapt their services, marketing strategies, and pricing strategies to better meet the needs of their target audience.



Fig 3: Blockchain Technology in tourism

1.6 Blockchain Technology

Blockchain technology is increasingly being used to increase transparency, security, and efficiency in the travel industry. By leveraging a blockchain-based platform, travelers can securely store and manage their digital identities, passports and travel documents, reducing the risk of identity theft and fraud. Additionally, block chain enables faster and more secure transactions for booking accommodation, purchasing tickets and processing payments.

Transformation in travel and tourism industry has certainly led to rise in numbers of people travelling across the globe. According to UNWTO from 674 million in 2000, the overall international tourist arrivals have grown to 1,186 million in 2015. International tourist arrivals worldwide are expected to increase by 3.3% a year between 2010 and 2030 to reach 1.8 billion by 2030. These figures are evidence about the potential travel and tourism industry carries and how digital transformation in this landscape will benefit.

II. Objective of the study:

The paper explores how digitalisation and AI tools will help better define the future of the tourism industry in India and how the new trend will impact the evolution of the travel, tourism and hospitality sector in the country. The paper also takes a keen look at how the overall technology inclusion among the stakeholders in the industry ecosystem can be realized.

1. To understand the concept of digitalization in travel & tourism.
2. To understand the contribution of mob social media, online travel booking in the growth and success of tourism industry.
3. To understand the challenges faced by the travel and tourism industry in India.
4. To evaluate the future prospects.

III. DIGITALISATION IN INDIAN TOURISM INDUSTRY



Fig 4: IOT application

- Through online booking platforms websites and mobile apps like Make my trip, yatra, cleartrip, and IRCTC allow travellers to book flights, trains, hotels, and holiday packages. These platforms offer seamless booking and payment processes as well as real time availability of travel options also provided to consumers.
- India has introduced E- Visa and E- Tourist visa facilities for tourists from over 170 countries. This digital process simplifies visa applications, reduces paperwork, and speeds up the approval process, enhancing the experience for international tourist.
- By using virtual tours many historical monuments, museums and attractions now offer virtual reality (VR) and 360-degree tours, allowing users to experience the destination virtually before booking. Platforms such as Google Arts and Culture also offer virtual experiences of Indian heritage sites such as the Taj Mahal and Ajanta Caves.
- Now many online travel companies and hospitality providers use chatbots to provide instant customer services. These chatbots can help while booking, travel advice, and provide real time information on flights, hotels, or other services.

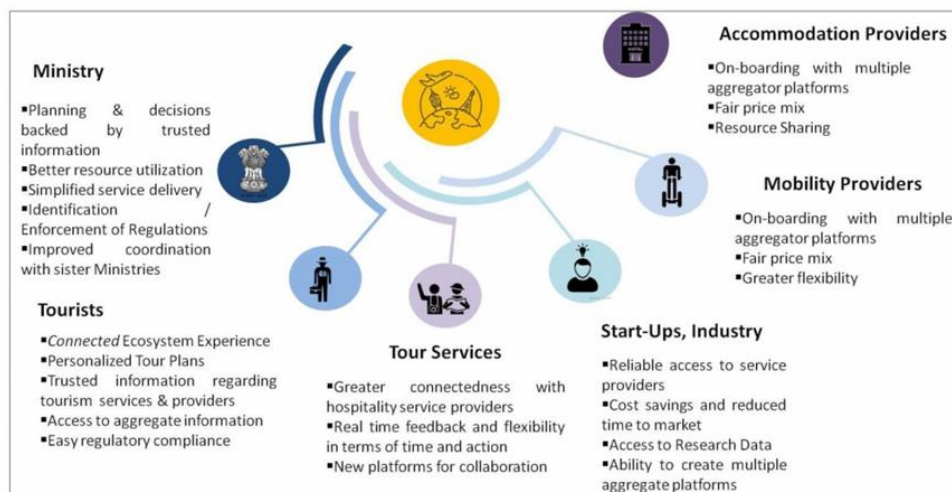


Fig 5: features of smart city initiatives

- In India Smart Cities initiative in cities like Jaipur and Varanasi are implementing IOTs (Internet of Things) technologies to enhance tourist experiences. This includes Smart parking, Wi Fi zones, Smart street Lightings and tourism information kiosks connected to central system to help tourist navigate the city efficiently.



Fig 6. NDTM: Bridge the information gap amongst different stakeholders by creating a digital highway

India's traditional outlook received a jolt when the decree of demonetization dawned on them as India, under the leadership of Shri Narendra Modi, envisaged a cashless economy. In March 2022 National Digital Tourism Mission was launched by the Ministry of Tourism Government of India under various missions like the Digital India program, National Digital Health Mission, etc. to promote digitalization, innovation, and technology in the tourism sector. In Fig 7, four different layers of the NDTM digital stack in which very first layer includes Cross-domain generic building blocks, next that in second layer consists of tourism domain data in which tourism directories, tourism registries, and tourism records are available, in third layer Unified Tourism Interface which promotes data and information exchange amongst multiple ecosystem actors through the creation of the UTI. The fourth layer consists of core, common, and reference systems and aggregate platforms. These aggregate platforms will be built using the Unified Tourism Interface.

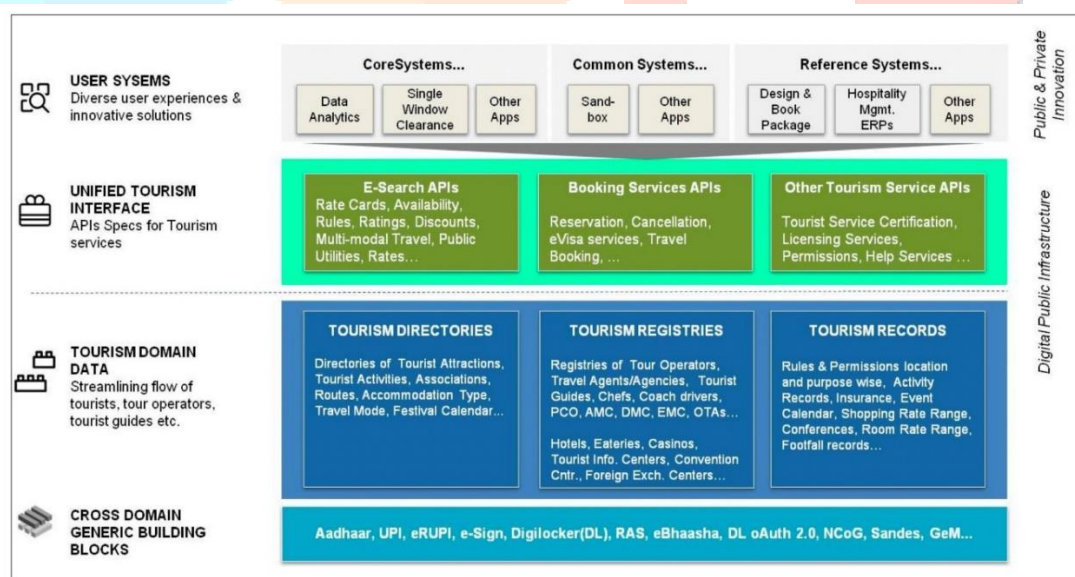


Fig 7: four different layers of the NDTMs digital stack

Ministry of Tourism has taken several digital initiatives over the years to make the country visitor friendly and to boost tourism sector in the country, details of which are:

(i) Launched Dekho Apna Desh People's Choice 2024 initiative with an objective of obtaining the public perception on the best tourist attractions across various categories (Spiritual, Cultural & Heritage, Nature & Wildlife, Adventure activities and others) for developing them into world-class tourist destinations. Ministry of Tourism has developed a microsite enabling citizens to choose their preferred tourist locations covering different categories through which creating an awareness among the citizens about the rich heritage and culture of the country and encourage citizens to travel within the country.

(ii) Conducting Programmes under the 'Capacity Building for Service Providers' (CBSP) Scheme to train and upgrade manpower to provide better service standards.

(iii) Ministry of Tourism has launched Incredible India Tourist Facilitator Certification Programme, a digital initiative that aims at creating an online learning platform with the objective of creating a pool of well-trained professional tourist facilitators across the country to support tourists.

(iv) 24×7 Toll Free Multi Lingual Tourist Helpline in 12 languages on February 8, 2016. It can be accessed on Toll Free Number 1800-11-1363 or short code 1363. The languages handled by the Tourist Helpline include ten international languages besides English and Hindi, namely, Arabic, French, German, Italian, Japanese, Korean, Chinese, Portuguese, Russian and Spanish.

(v) E-Visa is presently available under seven sub-categories i.e. e-Tourist Visa, e- Business Visa, e-Medical Visa, e-Medical Attendant Visa, e-Conference Visa, e- Ayush Visa and e-Ayush Attendant Visa. E-Tourist visa is available under 3 options –

- 05 years with multiple entry
- 1 year with multiple entry
- One month with double entry.

(vi) Utsav Portal launched to showcase festivals, events and live darshans across India to promote different regions of the country as popular tourist destinations worldwide.

(vii) The National Integrated Database of Hospitality Industry (NIDHI) is a technology driven system, which is to facilitate digitalization and promote ease of doing business for hospitality & tourism sector. This initiative has been upgraded as NIDHI+ to have more inclusivity, that is, of not only Accommodation Units, but also Travel Agents, Tour Operators, Tourist Transport Operators, Food & Beverage Units, Online Travel Aggregators, Convention Centres and Tourist Facilitators.

(viii) The Ministry of Tourism launched a mobile application called Swachh Paryatan on February 22, 2016, which will let citizens report any hygiene issues at various tourist destinations across the country.

(ix) Adarsh Smarak: ASI has identified 100 monuments to be developed as Model Monuments. These monuments would be provided necessary tourist facilities including Wi-Fi, security, signage, encroachment free area, interpretation centres showing short films about the importance of monuments and signboards of Swachh Bharat Abhiyan. Some of the monuments included in Adarsh Smarak scheme are Leh Palace (Leh), Humayun's Tomb(New Delhi), Red Fort,(Delhi), Shore Temple (Mahabalipuram), Elephanta Caves (Mumbai), Taj Mahal (Agra), Rani-ki-Vav (Gujarat) among others.

IV. Statistical reports

According to a recent report by Ministry of Tourism, the travel and tourism contributed, the number of Foreign Tourist Arrivals (FTAs) in India during 2022 increased to 6.44 million as compared to 1.52 million in 2021, registering a positive growth of 321.54% and achieved 58.9% recovery as compared to pre-pandemic year 2019. 1.50% of worldwide tourists come to India. In 2022, FEEs from Tourism in India is 17.611 billion and it has 1.70% share in world tourism receipt. According to the recent report of Tourism Satellite Account (TSA), Travel and Tourism created 70.04 million (direct + indirect) jobs in the year 2021–2022. In terms of GDP, during 2021–2022, tourism contributed 1.77 percent (direct + indirect) jobs directly supported by the sector across sub-segments such as hotels, travel agents/tour operators and restaurant. As mentioned below in report published in statista, survey analysed the use of AI chatbots via mobile devices to plan or travel across 15 markets worldwide. Among the selected countries, the United States reported the highest share of travellers using AI via either a phone or tablet for travel planning reasons, with 63 percent of respondents reporting doing so. On the other, just 45 percent of surveyed Indian travellers mentioned doing the same with second highest share of travellers using AI via either a phone or tablets for travel planning.

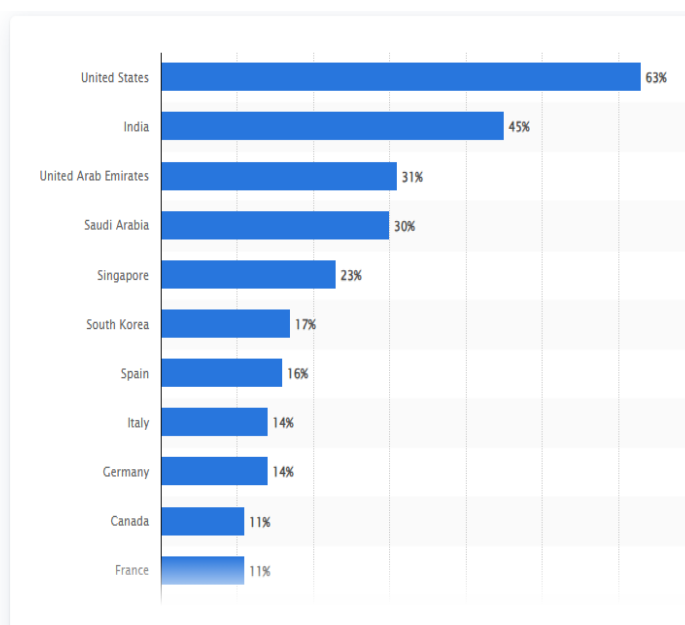


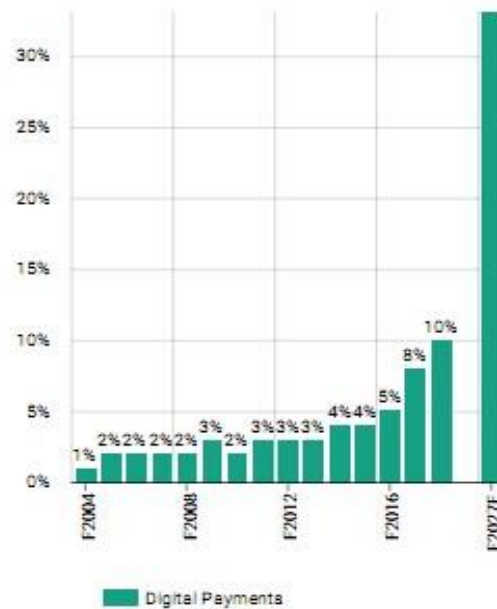
Fig 8: Share of travellers who used a mobile device to plan or research travel with an AI chatbot worldwide as of October 2023, by country

According to recent World Economic Forum Ranking report, India's ranking in the World Economic Forum's Travel and Tourism Development Index has improved to 39 in 2024, from 54 in 2021. While our natural, cultural and non-leisure resources are ranked in the first 10, India must endeavour to be among the top 10 on the index by 2030. The ranking is based on five dimensions, 17 pillars and 102 indicators, and we must focus on each of these to create a world-class tourism experience. Skill development, capacity building, digital transformation, leveraging technology and focused master plans for niche tourism segments, such as adventure, MICE (meetings, incentives, conferences and events wellness, cruise, heritage, wildlife, medical, and special interest tourism, are critical.



Fig 9: Tourism and travel development Index 2024

In figure10, the data gathered from RBI, NCPI, & CEC research shows continuous rise of UPI (Unified Payment Interface) and wallets like Paytm, Google pay, and phone pe has made it easier for tourist to pay for services digitally. The shift to cashless payment reduces the hassle of carrying physical currency and simplifies transactions across various tourism related services.



Source: RBI, NPCI, CEIC, Morgan Stanley Research (E) estimates

Fig 10, digital payment estimate

V. Challenges faces by Indian tourism industry in integrating digitalization and AI implementation

5.1 Infrastructure deficiencies

Many tourist destination, particularly in rural or remote areas, still lack adequate digital infrastructure, such as high speed internet and reliable electricity. This limit the scope of implementing digital technologies and AI solutions effectively.

5.2 High cost

The integration of advanced technologies like AI, virtual reality, and automation often requires substantial financial investments. For small and medium sized enterprises (SMEs) in the tourism sector. This can be a significant hurdle, as they may not have the resources to invest in digital transformation.

5.3 Digital literacy

Many tourism industry professionals, especially in smaller and less tech-savvy businesses (like small hotels, local guides, and regional tour operators), are not well-versed in using digital tools and AI solutions. Tourists, particularly from older generations or rural areas, may prefer traditional modes of booking and may not trust or understand AI-driven platforms or digital payment systems.

5.4 Integration with Existing Systems

The Indian tourism industry consists of a diverse range of players, from large hotel chains to individual tour operators. Many businesses use outdated or fragmented systems, making it difficult to create a unified digital ecosystem. Integrating AI with legacy systems (e.g., booking systems, customer management software) can be challenging. There is also lack of standardized protocols for data exchange, which hampers seamless integration between digital platforms and AI-driven systems across the sector.

5.5 Skilled Workforce Shortage

There is a shortage of AI and data science experts who can tailor AI solutions to the specific needs of the tourism industry in India. The lack of trained personnel to implement, maintain, and optimize AI technologies slows down the adoption process. Continuous training of existing employees on AI, machine learning, and digital tools is essential, but many businesses struggle to find the time and resources to up skill their workforce.

5.6 Cultural and Language Diversity

India's linguistic diversity can complicate the development and implementation of AI solutions. AI-powered tools such as chatbots or translation apps need to be able to support multiple languages and dialects, which increases complexity and development costs. AI solutions and digital platforms need to be culturally sensitive and adapted to the preferences of diverse tourist demographics. This can be challenging for businesses seeking to offer personalized services at scale.

5.7 Regulatory and Policy Challenges

The lack of uniform regulations regarding digital platforms, AI applications, and data security across India creates uncertainty for tourism businesses looking to adopt AI solutions. Although there is a growing focus on digitalizing the Indian economy, the tourism sector still lacks adequate government support in terms of funding for technology adoption, creating a conducive regulatory environment, and offering tax incentives for digital transformation.

5.8 Consumer Trust and Adoption

Some tourists may be wary of using AI-based tools due to concerns about the reliability of recommendations, data security, or the lack of human touch in customer service interactions. While digital payments are growing in India, challenges like lack of trust in online transactions, insufficient access to mobile wallets, and concerns over payment fraud still hinder the widespread use of digital solutions in tourism.

5.9 Ethical and Environmental Concerns

AI systems may inadvertently promote over-tourism by recommending popular destinations and activities without taking into account the environmental impact. There is a need for AI systems to balance the tourism industry's growth with sustainability efforts.

VI. Success of digitalisation and AI integration in Indian tourism industry: Future outlook

AI Based travel agents could replace traditional intermediaries. Voice search and conversational AI can dominate booking. Multilingual AI assistants can serve to diverse linguistic needs. Smart tourism hubs with real time data on weather, transport, and footfall. AI driven crowd management can be used to avoid congestion at tourist spots. AR based immersive experience can be used to enhance beauty of tourist spot to attract more gathering to the site.

VII Conclusion

The aim of this research was to contribute to the literature, examining the impact of artificial intelligence and digital integration on the tourism industry. It can form the base for the development of applications, leading to services optimization and improved user experience. The statistical analysis showed that the use of these technologies enables tourism companies to increase their business performance, establish better relationships with their customers, achieve better economic results and potentially gain competitive advantage. Indian tourism industry is actively embracing digitalization and artificial intelligence to enhance travellers experience and also to improve operational efficiency. However the extent to implementation of this varies across different sectors in the country. Digitalization and AI are progressively transforming Indian tourism industry offering enhanced services such as significant portion of travel booking is now conducted online through with mobile devices playing a crucial role in booking last minute bookings. Tourism industry is now leveraging AI for various applications, including chatbots for customer service, predictive analytics for demand forecasting and personalised travel recommendation. Now a days, authorities and stakeholders using latest tech to manage crowd at mega events. Ex, (Maha Kumb 2025), AI based soft wares helps to trace missing, provide crowd surge alert, under water drones are also used to monitor accidents in river. However, due to the fact that AI is a new technology, the level of adoption in the Indian tourism industry is still very low, apart from specific endeavours, mostly of big companies. Therefore, there is still much room for research in sustainable usage of smart technologies, which could be used by companies to ensure their benefits in their task environment.

VIII. References

1. Kumar, S., & Shekhar. (2020). Digitalization: A Strategic Approach for Development of Tourism Industry in India. *Paradigm*, 24(1), 93-108. <https://doi.org/10.1177/0971890720914111>
2. Tsaih, R.H. & Hsu, C.C., Artificial intelligence in smart tourism: A conceptual framework. *Proceedings of the 18th International Conference on Electronic Business*, pp. 124–133, 2018.
3. Samara, D., Magnisalis, I. & Peristeras, V., Artificial intelligence and big data in tourism: A systematic literature review. *Journal of Hospitality and Tourism Technology*, 11(2), pp. 343–367, 2020.
4. Zsarnoczky, M., How does artificial intelligence affect the tourism industry? *VADYBA*, 31(2), pp. 85–90, 2017.
5. Kazak, A.N., Chetyrbok, P.V. & Oleinikov, N.N., Artificial intelligence in the tourism sphere. *IOP Conference Series: Earth and Environmental Science*, 421(4), 042020, 2020.
6. Fatima, S., Desouza, K.C. & Dawson, G.S., National strategic artificial intelligence plans: A multi-dimensional analysis. *Economic Analysis and Policy*, 67, pp. 178–194, 2020.
7. Xie, K.L., Zhang, Z. & Zhang, Z., The business value of online consumer reviews and management response to hotel performance. *International Journal of Hospitality Management*, 43, pp. 1–12, 2014.
8. Tuo, Y., Ning, L. & Zhu, A., How artificial intelligence will change the future of tourism industry: The practice in China. *Proceeding of the ENTER 2021 eTourism Conference*, pp. 83–94, 2021.
9. Xiang, Z., Magnini, V.P. & Fesenmaier, D.R., Information technology and consumer behaviour in travel and tourism: Insights from travel planning using the internet. *Journal of Retailing and Consumer Services*, 22, pp. 244–249, 2015.
10. Oklobdžija, S.D. & Popescu, J.R., The link between digital media and making travel choices. *Marketing*, 48(2), pp. 75–85, 2017.
11. Chuang, T.C., Liu, J.S., Lu, L.Y., Tseng, F.M., Lee, Y. & Chang, C.T., The main paths of tourism: Trends of managing tourism through internet. *Asia Pacific Journal of Tourism Research*, 22(2), pp. 213–231, 2017.
12. Busulwa, R., Pickering, M., & Mao, I. (2022). Digital transformation and hospitality management competencies: Toward an integrative framework. *International Journal of Hospitality Management*, 102, 103132.
13. Cai, W., Richter, S., & McKenna, B. (2019). Progress on technology use in tourism. *Journal of Hospitality and Tourism Technology*, 10(4), 651-672.
14. Choi, Y., Hickerson, B., & Lee, J. (2021). Investigation of the technology effects of online travel media on virtual travel experience and behavioral intention. In *Visual Media and Tourism* (pp. 32-48). Rutledge.
15. Hadjielias, E., Christofi, M., Christou, P., & Drotarova, M. H. (2022). Digitalization, agility, and customer value in tourism. *Technological Forecasting and Social Change*, 175, 121334.
16. Shen, S., Sotiriadis, M., & Zhang, Y. (2020). The influence of smart technologies on customer journey in tourist attractions within the smart tourism management framework. *Sustainability*, 12(10), 4157.
17. Afonasyova et.al. (2019), "Digitalization in Economy and Innovation: The Effect on Social Processes" *Polish journal of management studies*, vol.6, Iss.3/10, pg.22.
18. Ashok Kumar Deborah (2017) "Cashless Economy and Digitalization of Tourism & Hospitality Practices in India", *Journal of Travel and Tourism*, vol.13, pp34-35.
19. • Gartner (2016) "Digitalization of the Tourism Industry: A multiple stakeholder analysis" *Journal International Technology Glossary* (available at <http://www.gartner.com/it-glossary/digitalization/>, retrieved August 8, volume:3, Iss.9 (2016)
20. Rathi .A (2018) "Digital Transformation of Travel and Tourism in India" *International journal of trend in scientific research and development*, volume: 5, Iss: 6, Pg: 4.
21. Jiang, C., Phoong, S.W. A ten-year review analysis of the impact of digitization on tourism development (2012–2022). *Humanit Soc Sci Commun* **10**, 665 (2023). <https://doi.org/10.1057/s41599-023-02150-7>
22. Kumar, S., & Shekhar. (2020). Digitalization: A Strategic Approach for Development of Tourism Industry in India. *Paradigm*, 24(1), 93-108. <https://doi.org/10.1177/0971890720914111>
23. Hadjielias E, Christofi M, Christou P & Drotarova M(2022), "Digitalization, agility, and customer value in tourism" vol. 175, <https://doi.org/10.1016/j.techfore.2021.121334>
24. Ouerghemmi, C., Ertz, M., Bouslama, N., & Tandon, U. (2023). The Impact of Virtual Reality (VR) Tour Experience on Tourists' Intention to Visit. *Information*, 14(10), 546. <https://doi.org/10.3390/info14100546>

25. Irfan M, Yadav AK (2016) 'Travel in India': International Advertising Programme for Promoting Multi-Dimensional Tourism in India. J Tourism Hospit 5: 203. doi:10.4172/2167-0269.1000203

