

# A Comprehensive Study of AI and IoT's Impact on Smart Tourism Destinations

Muhammad Saleem<sup>1\*</sup>, Muhammad Jasim Shah<sup>1</sup>, Muhammad Wajid<sup>1</sup>, Muhammad Akhter<sup>2</sup>, and  
Javaid Ahmad Malik<sup>2</sup>

<sup>1</sup>Emerson University Multan, Pakistan.

<sup>2</sup>National College of Business Administration and Economics, Pakistan, Pakistan.

\*Corresponding Author: Muhammad Saleem. Email: rana.saleem@eum.edu.pk

Academic Editor: Salman Qadri Published: April 01, 2024

**Abstract:** The present studies intend to implement the use of Artificial Intelligence (AI) and the Internet of Things (IoT) in order to upgrade Smart Tourism Destinations (STDs). The fusion of artificial intelligence (AI) and Internet of Things (IoT) technologies marks an unmatched advantage for tourism in many aspects like personalized suggestions, instantaneous information retrieval, etc. The project is aimed at doing a deep study of the present situation, complications, and future of the STDs within the artificial intelligence (AI) and internet of things (IoT) integration. The article starts to explore different AI techniques as well as data gathering methods that IoT can provide improving the quality of tourist experiences and destination management processes. However, solving these hurdles regarding privacy and data security is of utmost importance. Research also has the unique view of these coming technologies including Augmented Reality (AR) and Virtual Reality (VR) that can take STDs to the next level. The primary goal is to be the pioneer in offering smart and people centric tourism destinations. The paper summarizes the impact of technologies based on artificial intelligence (AI) on sexually transmitted diseases (STDs) and underscores the necessity to analyse ethical aspects, data accuracy, comprehensibility, and cooperation between humans and AI. This ensures AI is used responsibly and efficiently in the tourism industry.

**Keywords:** Artificial Intelligence; IoT; Smart Tourism Destinations; Traveler Experience; Destination Management.

## 1. Introduction

The proven fact that such research is necessary is undeniable as the Smart Tourism Destinations (STDs) are now referred to as a major trend in the tourism segment, where the knowledge and technologies are used for better service of tourists and for achieving administrative efficiency. With the interrelationship of Artificial Intelligence (AI) and the Internet of Things (IoT), it has turned the conventional STDs to be an innovative and intelligent sort of destination. The conjunction of AI and IoT technology affords unordinary prospects for changing many aspects of tourism, which comprise of pre-travel suggestions to natural language processing, real-time collection of data, and predictive analysis [1].

The goal of this research is to obtain an in-depth look into the utilisation of AI and IoT for smart destinations through tourism. Through the analysis of these two technologies and their wide range of impacts, we aim to provide the public with an appreciation for the importance of AI and IoT integration in the future disease management. In addition, we want to show some of the most important strategies and technologies that are very effective in the strategic development of more smart and visitor-oriented tourism destinations [2]. Having done a complete evaluation and investigation of the current literature, real-life applications, and case studies, our aim is to deliver a multi-faceted knowledge of both the benefits and hindrances the AI and IoT technologies present when combating STDs. We will look through different artificial intelligence models such as machine learning, natural language processing and image identification that can empower travelers to receive customized suggestion and provide improved experience.

Additionally, we will observe information technology that gathers data, such as live monitoring of the environment, optimizing transportation, and tracking number of tourists. One of the implications of these approaches is that they could potentially revolutionize destination management and operational effectiveness [3].

Despite that the incorporation of smart artificial intelligence (AI) and networking of things (IoT) in sexually transmitted diseases (STDs) may have some problems. Several challenges like privacy and data security issues, miniature system integration, and requirement of strong technical foundation must be dealt with. In the rest of this debate, we are going to thoroughly investigate all these problems putting forward vital measures on how to deal with them and the most appropriate approaches for dealing with them [4].

The study also involves the probing into the future direction of artificial intelligence (AI) and the internet of things (IoT) in solving sexually transmitted diseases. Our proposal goes beyond just the development of the technologies like Augmented Reality (AR) and Virtual Reality (VR), cutting-edge sensors, and predictive analytics. Through this introduction of technology, the travel destinations are given all the capabilities to become interactive and to be full of information which will benefit the tourist [5]. Consequently, this research is focused on giving an analysis of how artificial intelligence and the Internet of Things may be used in a smart tourism destination to be successful. Through an in-depth research of the current condition, problems, and future outlook or sexual transmitted diseases which are related to the interplay between artificial intelligence and Internet of Things (IOT), it is our aim to contribute more to the development of smart tourist places and generate more research and innovation in this area [7].

The purpose of this research is to evaluate how AI and the Internet of Things (IoT) affect the smart tourism area. Through this report, we seek a comprehensive way to fully analyze the use of machine intelligence (AI) and connectivity (IoT) tied to tourism destinations. The research intends to analyze the potential outcomes of the latest technologies on tourists' experiences, resources managing, and sustainable development of smart tourism destinations. This expected finding should be key to successful implementation of AI and IoT in the tourism industry, where it will help to create more intelligent and efficient tourist destinations. This research has instantly and significant meaning to the subject of smart tourism by bringing new points to the industry innovations and growth due to the rapid development of technologies.

## 2. Literature Review

The emergence of "smart tourism" has been a response to the impact of advanced information and communication technologies (ICTs) on tourism destinations, as well as on travelers and corporations. This phenomenon offers a new approach to adapt to the evolving realities of the sector [8].

The primary focus of research in the subject of smart tourism has been on Smart Tourism Destinations. The study focused on the establishment of a framework for smart tourism destinations in response to the increasing development of smart cities. It investigated the potential improvements in visitors' experiences through personalized services offered by smart tourism destinations. Moreover, the theoretical framework was constructed to examine the degree of competitiveness in smart tourism destinations. The research also assessed the role of smart travel systems and solutions in improving tourism experiences and destination administration's management processes [9].

As a smart concept, the term "smart tourism destination" can be viewed as an extension to the idea of a tourism destination, with a practical framework for governing and monitoring destinations being the long-term benefit [2]. Further more, developing marketing relations with destinations having mainly one attractive spot or having many attractions can be complicated, therefore the notion becomes more important [11]. The chief goals of smart tourism destinations are to optimize the tourism experience, upgrade the levels of efficiency in resource management and keep the longevity in sight. These goals should become a competitive advantage and provide satisfaction to tourists.

A Smart Tourism Destination can be characterized in multiple manners. During their investigation, the researchers provide numerous definitions and conceptualizations of the term, with the bulk of them emphasizing the role of ICTs. Smart Tourism Destinations are locations where the utilization of different Information and Communication Technologies (ICTs) is involved in the development and implementation of tourism processes, as stated by the authors. In the initial attempt to establish "smart tourist destinations," the authors placed significant emphasis on the utilization of various information and communication technologies (ICTs) and engaging with stakeholders in a specific site. The authors argue that the

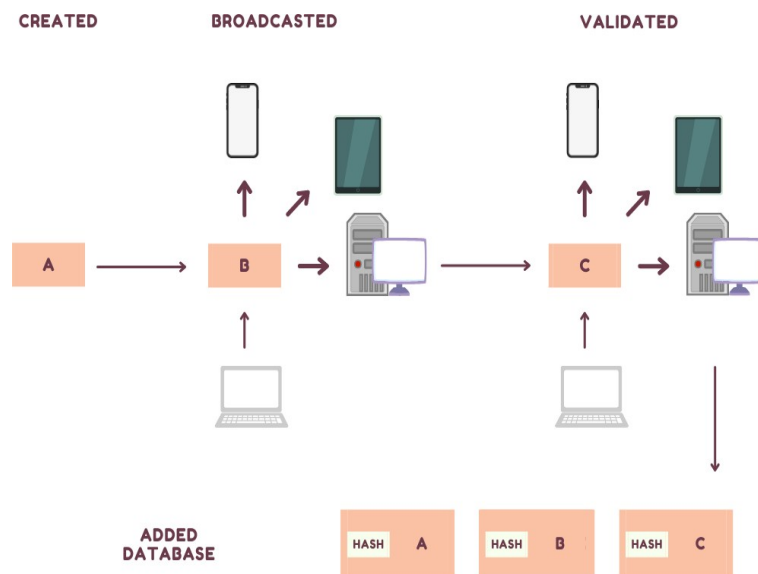
essence of smart tourism destinations lies in effectively addressing visitors' needs via the use of information and communication technologies (ICTs), with the aim of enhancing tourism management and improving the quality of tourism services [13]. Smart tourism destinations are sites that utilize existing technologies to generate benefits and revenues for tourism-related businesses and the destination itself, while also providing value, enjoyment, and experiences for travelers. Moreover, based on the literature about smart tourism destinations, these locations actively collect and analyze data in order to gain a deeper understanding of visitors' desires and behaviors. This enables them to provide improved services and experiences that are more timely and tailored to the specific setting. The construction of smart tourist sites is expected to enhance the travel and tourism sector by offering a single platform that provides open access to data for both tourism enterprises and travelers [14].

Smart tourist destinations distinguish themselves from traditional tourist destinations by leveraging advanced technology and utilizing extensive data to establish connections among stakeholders, make informed decisions, and ultimately enhance travel opportunities for tourists while increasing the competitiveness of the destinations [15].

### 3. Proposed Methodology

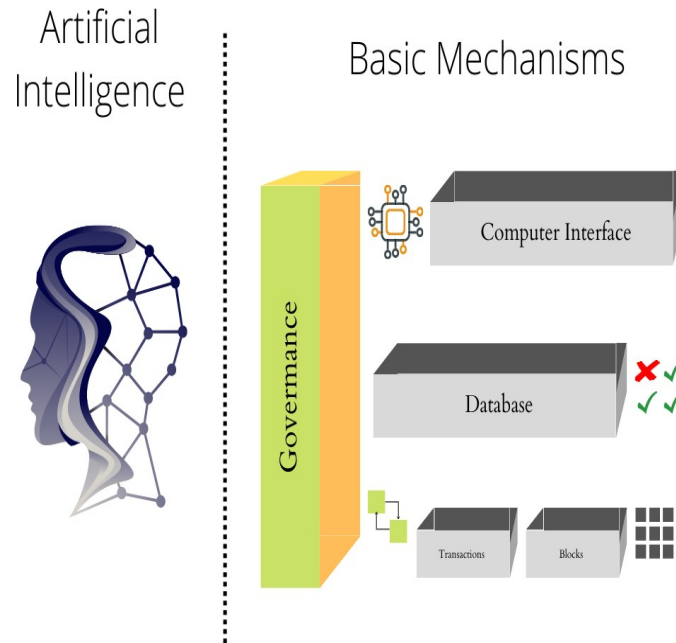
Artificial Intelligence (AI) has been extensively researched and studied, with researchers investigating numerous facets of this revolutionary technology. The discipline of AI study endeavors to expand the capabilities of machines in terms of perception, cognition, and decision-making, through the development of sophisticated machine learning algorithms and the design of intelligent systems [16].

AI scientists are researching techniques to improve the accuracy and efficiency of machine learning algorithms. They are working on new methodologies and models of programming which can understand large data volumes, enable them to use the learned knowledge to solve new problems, and make AI systems more understandable. Besides this, the development of AI algorithms which are capable of learning from a small amount of data and adapting to different scenarios is also among the priorities of researchers. This means that computers can continuously improve their performance with the passage of time [17].



**Figure 1.** Artificial Intelligence Architecture

NLP which is a sub-discipline of AI research focuses on creating algorithms that allow machines to understand and deliver language as humans do [18]. Scientists are currently aiming at the development of algorithms that would be able to both appropriately analyze and identify the significance of written language. Thus, robots can conduct tasks, like sentiment analysis in texts, distilling the summary of text, and translate it from one language to the other. AI aims for generating conversations between humans and AI systems, enabling the system to understand and respond in a way that contributes to the contextual richness of the interaction.



**Figure 2.** A Typical Artificial Intelligence Workflow

As an integral part of AI, computer vision explores the opportunity of equipping machines with the ability to see and understand visual information. Researchers are at present working on creation of algorithms and models that are capable of reliably identifying objects, detection and monitoring movements and the thorough analysis of intricate visual scenes [19]. These findings are highly applicable to fields of self-driving autos, medical imaging, surveillance, and augmented reality systems.

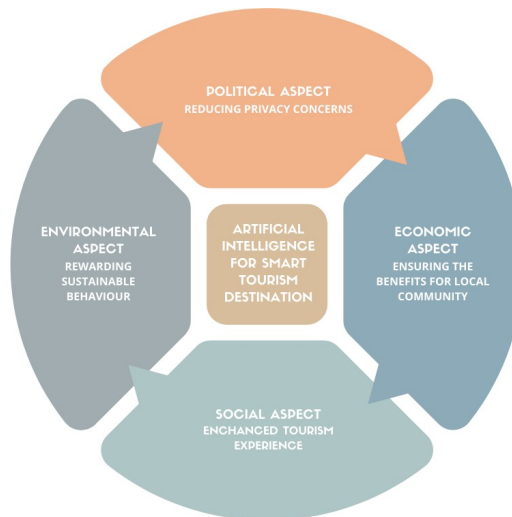
The questions of ethics and justice in AI design now warrant more attention than ever before, as the emerging field of AI captures people's attentions and evokes debates. Scientists are focusing on ways to control prejudice and ensure that the AI systems being deployed are unpredictable and accountable [20]. The framing and rule dealing with possible bias existing in algorithm and privacy issues is underway. Moreover, there is a lot of work going on to deal with societal implications of automation.

Besides, multidisciplinary approaches in AI research become more evident where a convergence of scientists from varied fields happens in a bid to solve complicated issues. AI tech engineers started working together with psychologists, neuroscientists, sociologists, and many other reviewers in order to learn more about human intelligence and behavior in depth [21]. The target of this transdisciplinary approach is to construct synthesizers of artificial intelligence, which will be characterized both by the neural networks and the ability to act and communicate in a way similar to human instincts.

In the long run, AI students look over AI's diverse components in a changing and forward-looking field. AI's future is being determined by more advanced learning techniques, natural language processing, computer visualization and ethics issues. It is "second nature" for AI-powered processes to always change industries, improve decision making processes efficiency and intercourse between human and machines.

### 3.1 Artificial Intelligence for Smart Tourism Destination

Artificial Intelligence (AI) is a significant key to improving and upgrading Smart Tourism Destinations (STDs) and setting them to new heights of prestige. By leveraging AI technologies like machine learning, natural language processing, and computer vision, the company can offer unique and immersive services to guests, while simultaneously enhancing efficiency of their operations and transforming destination management through, STDs. AI's brilliance arises from its proficiency in collecting, scrutinizing, and deducing enormous data that assists STDs to comprehend visitor demands, their habits, and new patterns. This data is very important for offering customized suggestions, balancing the allocation of resources and, ultimately, improving the whole visitor experience. This is the way ICT introduces intelligent tourism through new standards.



**Figure 3.** Benefits of AI Smart Tourism Destination from a Holistic View of Sustainability.

### 3.2 Respondent Characteristics

Smart travel destinations implement a variety of strategies so as to increase travelers' trip satisfaction and reduce the possible problems, which might cause unpleasant mood. These techniques incorporate the institution of early feedback loop, the giving out of information to the public in real time, and the improvement of client service in areas as: misplaced luggage, safety issues, delay periods, and long queues. Smart Tourism Destinations feel themselves obligated to offer personalized services which are already meeting the requirements of visitors. Here, it encompasses offering related information that can assist in the planning stage, providing real time data based on user profiles, allowing access to updated information that may help in exploring the destination, as well as creating feedback system that is dependable to monitor the visitor's experience and collect valuable inputs [24].

The application of modern technologies like Artificial Intelligence and the Internet of Things (IoT) in smart tourism destinations are triggered by multiple major reasons. These technologies make it possible to have integrity check, secure transmission of information, reduction of costs, and transparency. They make customers and service providers self-service by removing the middlemen, hence, facilitating one to one interaction and equal footing. Smart Tourism Destinations bring together both major and small-scale businesses and service providers to allow them to present and market their work, hence contributing to economic growth and variety. Technology that enables visitors to get real travel experiences available and timely information, consequently enhancing their quality of travel support as well. The destinations of smart tourism can take advantage of technologies such as travel video surveillance, luggage tracking, quick check-in, and travel insurance, which guarantee high-quality guest services and a smooth travel experience. Making use of cryptocurrencies for person-to-person transactions comes with advantages such as low cost, high security, and absence of intermediary, which could make the task of paying for travel services simpler and easier for some travelers. Furthermore, the systems of ranking and reviews also enable the travelers to offer genuine comments and assessments, hence other travelers are helped in the process of decision making. These technologies provide accuracy and reliability of the data, which enabled built-in services that are personalized for visitors, and thus increase their pleasure and influence their experience positively [25].

### 3.3 Respondent Characteristics

A smart strategy with AI and blockchain for motivation of sustainable behavior is the development of digital systems with a cryptocurrency background to enable incentive systems. Through tapping into these technologies, destinations could even build platforms that work as a medium to create awareness, monitoring and rewarding sustainable actions. The travelers and locals will be asked to be engaged in the conservation practices such as energy and water conservation, employing the eco-friendly means of transport, minimizing trash and recycling, and shifting to local sustainable businesses. Through this service, people are able to either acquire digital currency or vouchers that they can take also to have discounts on hotels, attractions, or on local belongings. This is another stimulating factor of the process of eco-friendliness implementation.

AI can be effectively involved in encouraging people to engage in sustainable behavior and educating them on the subject through educational programs. Artificial intelligence (AI) based on the study of user information and preferences can be used to customize educational content and give visitor recommendations. This will highlight the importance of sustainable methods of management and provide information about local nature conservation projects. AI chat-bots and virtual assistants can be used as self-forming mentors with the latest knowledge on green activities, projects, and sites to visit. Through applying AI in educational programs and awareness materials at destinations, tourists could be recommended procedures that would empower them to become responsible and sustainable tourists.

### 3.4 Ensuring the Benefits for Local Community

Through the medium of artificial intelligence tourists engage with local providers directly as a result of which the interest of the local people enhances. AI-enabled platforms and applications provide direct links, allowing the products/services to be marketed to tourists by local businesses, craftsmen, and service providers without a middleman. This is fueling economic growth and development of various enterprises in the community through inculcating ownership spirit in local entrepreneurs. Placing the local companies on display thanks to the use of AI that will highlight their unique products and services the destinations ensure undisputed fame and marketing for their products, thus bring economic prosperity to the locals [28].

AI is one of the critical areas in protecting and improving the local cultural roots. AI provides the ability to apply advanced machine learning and natural language processing techniques to provide an effective analysis and comprehension of cultural strata which includes historical artifacts, cultural norms and local knowledge. One of the benefits of digitization and preservation is that it ensures that tourists are able to get the kind of interaction and engagement they want from the sites, and in the end, their understanding and appreciation for the cultural character of the local community is improved. With the help of AI-powered virtual tours, augmented reality applications, and interactive exhibits local past and customs are placed before the viewer, generating cultural exchange and understanding. Using AI can support preserving local heritage and promote culture development which would improve the experience of tourism and strengthen the link between visitors and local community [30].

### 3.5 Reducing Privacy Concerns

Artificial intelligence (AI) significantly shapes the experience of Smart Tourism Destinations (STDs) through guest service and operational improvements. Anyway, however, the privacy matters should be addressed during AI acceptance, with a goal of responsible and ethical actions in the area of STDs. For addressing this issue STDs can apply some techniques like becoming a company that uses transparent data handling policies. Transparency on the type of data being collected, mapping the purpose of the gathering and accessing data is a vital element that defines trust which will make visitors to share their personal information informed. Privacy by design principles must be embedded into the process of designing AI systems to give the highest emphasis to privacy in every part of their architecture, algorithms as well as procedures. Through integrating techniques like anonymization and data aggregation, visitor privacy can be strengthened, yet, this will not affect the overall data analytics result. For ensuring the data security and compatibility with the commonly spread privacy laws and regulations consent management systems have to be implemented, robust data security measures have to be applied in order to guarantee the compliance.

## 4. Key Challenges to Overcome

Extensive application of artificial intelligence causes some major challenges which should be solved to make use of AI evolve. The realm of ethics can be considered as the main difficulty. While computational engines advance, issues such as their decision-making systems and possible biases surface. Ensuring the impartiality, and transparency, and accountability of AI systems is the major part of the mission. To nurture trust and lessen the likelihood of issues like algorithm bias, data privacy and security, these problems should be addressed.

Furthermore, one of the challenges that emerge is the problem of data of the quality and accessibility. Artificial intelligence algorithms gather and use massive amounts of varied information to provide accurate projections. Getting data that meets high-quality and population-representation standards can be difficult, even in fields where data is lacking or privacy rules are very strict. To boost the detection and reliability of artificial intelligence, it is obviously necessary to look into the challenges of data gathering, labelling, and curation.

The dilemma of pursuing understandability and explicability in AI is no less important. AI models, and deep learning models in particular, are usually attributed to the 'black box' label due to the fact that they are hard to understand and decipher. The users' ability to understand AI systems' actions is limited when AI systems are not interpretable. It is important to invent techniques for the AI systems creation to facilitate the understanding and explaining their outputs, thus trust in people will grow.

The ultimate challenge is thus to formulate effective interaction between humans and AI and this is a downright issue that needs to be treated with caution. Artificial intelligence technologies should act as addition and support to human abilities and not compete them. Achieving the maximum beneficial equilibrium between automation and human engagement is the key. Grasping human parts such as trust, usability and user experience is part of package if AI systems are to be user-friendly, convenient and will easily blend in the current processes.

Addressing these bottlenecks opens the way to responsible and efficient use of AI, which, ultimately, can bring out its supreme potency to benefit society. The collaboration among researchers, policymakers and industry practitioners is crucial in constructing mechanisms, rules and policies that serve as the foundation for ensuring that the applied artificial intelligence is safe and reliable.

## 5. Conclusions

The research on the use of AI and IoT technologies to improve smart tourism destinations has shown that they are able to bring to the tourism industry a new quality of services and experiences. Smart tourism destinations (STDs) incorporate AI and IoT technology to design customized and immersive experiences, increase operational efficiency, and ultimately improve destination management. The comprehensive research done in this article has given us the needed perspective about the many uses and effects of AI and IoT in regard to STDs [36].

Integration of AI and IoT technologies enables smart devices to harvest and analyze large data amounts which gives team highly accurate visitor data such as behavior and preferences trends. The use of such data can be tailored to give personalized recommendations, better allocation of resources, and for improving the experience of visitors as a whole [38]. The different methods which include the machine learning, natural language processing and computer vision not only provide the great experience to the travel but also make the recommendations tailored. With that said, the application of the Internet of Things (IoT) technology as one of the useful ways of data collection, for instance environmental monitoring in real time and transportation optimization, improves the station management and the efficiency.

The application of the AI and IoT, together with the STDs, may lead to some challenges as well. The main obstacles that need to be overcome are the issues related to privacy and data security, the complication of system connection, and the requirement of a powerful technical infrastructure. Keeping visitor data and activities safe is the key element of safety. With the utilization of blockchain technology—which is associated with a privacy-orientated approach—we can provide a solution that allows users to keep control of their data using digital ID.

Smart touristic locations can be improved via multi-directional ways. The rising usage of non-verbal communication may be driven by convenience, multitasking ability, or preferences. These technologies, in turn, facilitate the development of interactive and stimulating spaces, thus enabling the creation of new ways in which culture is studied and enjoyed by the inhabitants of a given area. Therefore, the version of cryptocurrency-based reward systems which was actually implemented would not only motivate both tourists and the locals to take the actions that are good for the environment but also serve as a tool for the development of a socially responsible and economic power.

Consequently, smart tourism destinations by using IoT and AI would have to depend on the application of these technologies in determining what the future of the travel industry would look like. STDs can leverage the use of AI and IoT technologies to offer customized experiences, demonstrate higher efficiency and bring better destination management. Privacy concerns may hinder progress, however the benefits to AI and IoT in the management of STDs are immense. Through technological innovation and confronting these challenges directly, these destinations could become more intelligent, meeting the requirements and needs of tourists in a sustainable manner and providing these with unique experiences that are environment-friendly. The new findings will advance the existing understanding of smart tourism which will be useful for both industry players and scholars.

## References

1. J. M. Tien, "Internet of things, real-time decision making, and artificial intelligence,"
2. *Ann. Data Sci.*, vol. 4, pp. 149–178, 2017.
3. A. Lemmetyinen and F. M. Go, "The key capabilities required for managing tourism business networks," *Tour. Manag.*, vol. 30, no. 1, pp. 31–40, 2009.
4. G. Bedi, G. K. Venayagamoorthy, R. Singh, R. R. Brooks, and K.-C. Wang, "Review of Internet of Things (IoT) in electric power and energy systems," *IEEE Internet Things J.*, vol. 5, no. 2, pp. 847–870, 2018.
5. Y. Gamil, M. A. Abdullah, I. Abd Rahman, and M. M. Asad, "Internet of things in construction industry revolution 4.0: Recent trends and challenges in the Malaysian context," *J. Eng. Des. Technol.*, vol. 18, no. 5, pp. 1091–1102, 2020.
6. G. Giuggioli and M. M. Pellegrini, "Artificial intelligence as an enabler for entrepreneurs: a systematic literature review and an agenda for future research," *Int. J. Entrep. Behav. Res.*, vol. 29, no. 4, pp. 816–837, 2023.
7. W. Wang et al., "Realizing the potential of the internet of things for smart tourism with 5G and AI," *IEEE Netw.*, vol. 34, no. 6, pp. 295–301, 2020.
8. Y. El Archi, B. Benbba, Z. Nizamatinova, Y. Issakov, G. I. Vargáné, and L. D. Dávid, "Systematic Literature Review Analysing Smart Tourism Destinations in Context of Sustainable Development: Current Applications and Future Directions," *Sustainability*, vol. 15, no. 6, p. 5086, 2023.
9. P. Lee, W. C. Hunter, and N. Chung, "Smart tourism city: Developments and transformations," *Sustainability*, vol. 12, no. 10, p. 3958, 2020.
10. F. González-Reverté, "Building sustainable smart destinations: An approach based on the development of Spanish smart tourism plans," *Sustainability*, vol. 11, no. 23, p. 6874, 2019.
11. D. Buhalis and A. Amaranggana, "Smart tourism destinations," in *Information and communication technologies in tourism 2014*, Springer, 2013, pp. 553–564.
12. C. Tsai, "Memorable tourist experiences and place attachment when consuming local food," *Int. J. Tour. Res.*, vol. 18, no. 6, pp. 536–548, 2016.
13. P. Buonincontri and R. Micera, "The experience co-creation in smart tourism destinations: a multiple case analysis of European destinations," *Inf. Technol. Tour.*, vol. 16, pp. 285–315, 2016.
14. M. Naramski, "The Application of ICT and Smart Technologies in Polish Museums—Towards Smart Tourism," *Sustainability*, vol. 12, no. 21, p. 9287, 2020.
15. D. Z. Jovicic, "From the traditional understanding of tourism destination to the smart tourism destination," *Curr. Issues Tour.*, vol. 22, no. 3, pp. 276–282, 2019.
16. F. Femenia-Serra, B. Neuhofer, and J. A. Ivars-Baidal, "Towards a conceptualisation of smart tourists and their role within the smart destination scenario," *Serv. Ind. J.*, vol. 39, no. 2, pp. 109–133, 2019.
17. M. Woschank, E. Rauch, and H. Zsifkovits, "A review of further directions for artificial intelligence, machine learning, and deep learning in smart logistics," *Sustainability*, vol. 12, no. 9, p. 3760, 2020.
18. H. Benbya, S. Pachidi, and S. Jarvenpaa, "Special issue editorial: Artificial intelligence in organizations: Implications for information systems research," *J. Assoc. Inf. Syst.*, vol. 22, no. 2, p. 10, 2021.
19. E. Cambria and B. White, "Jumping NLP curves: A review of natural language processing research," *IEEE Comput. Intell. Mag.*, vol. 9, no. 2, pp. 48–57, 2014.
20. C. Zhang and Y. Lu, "Study on artificial intelligence: The state of the art and future prospects," *J. Ind. Inf. Integr.*, vol. 23, p. 100224, 2021.
21. K. Werder, B. Ramesh, and R. Zhang, "Establishing data provenance for responsible artificial intelligence systems," *ACM Trans. Manag. Inf. Syst.*, vol. 13, no. 2, pp. 1–23, 2022.
22. Y. Mao et al., "How data scientists work together with domain experts in scientific collaborations: To find the right answer or to ask the right question?," *Proc. ACM Human-Computer Interact.*, vol. 3, no. GROUP, pp. 1–23, 2019.
23. M. M. Maas, "Artificial intelligence governance under change: Foundations, facets, frameworks," *SSRN Electron. J.*, 2021.
24. A. Basili, W. Liguori, and F. Palumbo, "NFC smart tourist card: Combining mobile and contactless technologies towards a smart tourist experience," in *2014 IEEE 23rd International WETICE Conference*, 2014, pp. 249–254.
25. D. Edwards and T. Griffin, "Understanding tourists' spatial behaviour: GPS tracking as an aid to sustainable destination management," *J. Sustain. Tour.*, vol. 21, no. 4, pp. 580–595, 2013.
26. S. Mishra and A. K. Tyagi, "The role of machine learning techniques in internet of things-based cloud applications," *Artif. Intell. internet things Syst.*, pp. 105–135, 2022.
27. S. Ibnou-Laaroussi, H. Rjoub, and W.-K. Wong, "Sustainability of green tourism among international tourists and its influence on the achievement of green environment: Evidence from North Cyprus," *Sustainability*, vol. 12, no. 14, p. 5698, 2020.
28. T. Alam, R. Gupta, S. Qamar, and A. Ullah, "Recent Applications of Artificial Intelligence for Sustainable Development in Smart Cities," in *Recent Innovations in Artificial Intelligence and Smart Applications*, Springer, 2022, pp. 135–154.



30. S. Nandi, J. Sarkis, A. A. Hervani, and M. M. Helms, "Redesigning supply chains using blockchain-enabled circular economy and COVID-19 experiences," *Sustain. Prod. Consum.*, vol. 27, pp. 10–22, 2021.
31. M. S. Rahman, S. Bag, M. A. Hossain, F. A. M. A. Fattah, M. O. Gani, and N. P. Rana, "The new wave of AI-powered luxury brands online shopping experience: The role of digital multisensory cues and customers' engagement," *J. Retail. Consum. Serv.*, vol. 72, p. 103273, 2023.
32. J. Srouji and T. Mechler, "How privacy-enhancing technologies are transforming privacy by design and default: Perspectives for today and tomorrow," *J. Data Prot. Priv.*, vol. 3, no. 3, pp. 268–280, 2020.
33. N. Martinez-Martin et al., "Ethical issues in using ambient intelligence in health-care settings," *lancet Digit. Heal.*, vol. 3, no. 2, pp. e115–e123, 2021.
34. A. Hosny, C. Parmar, J. Quackenbush, L. H. Schwartz, and H. J. W. L. Aerts, "Artificial intelligence in radiology," *Nat. Rev. Cancer*, vol. 18, no. 8, pp. 500–510, 2018.
35. D. Gunning and D. Aha, "DARPA's explainable artificial intelligence (XAI) program," *AI Mag.*, vol. 40, no. 2, pp. 44–58, 2019.
36. Q. V. Liao, D. Gruen, and S. Miller, "Questioning the AI: informing design practices for explainable AI user experiences," in *Proceedings of the 2020 CHI Conference on Human Factors in Computing Systems*, 2020, pp. 1–15.
37. V. Dignum, "Responsibility and artificial intelligence," *oxford Handb. ethics AI*, vol. 4698, p. 215, 2020.
38. L. Lalicic and C. Weismayer, "Consumers' reasons and perceived value co-creation of using artificial intelligence-enabled travel service agents," *J. Bus. Res.*, vol. 129, pp. 891–901, 2021.
39. R. K. Behera, P. K. Bala, and N. P. Rana, "Creation of sustainable growth with explainable artificial intelligence: An empirical insight from consumer packaged goods retailers," *J. Clean. Prod.*, vol. 399, p. 136605, 2023.
40. N. M. Alzahrani and F. A. Alfouzan, "Augmented reality (AR) and cyber-security for smart cities—A systematic literature review," *Sensors*, vol. 22, no. 7, p. 2792, 2022.
41. U. Gretzel, "Smart tourism development.," in *Tourism in development: Reflective essays*, CABI Wallingford UK, 2021, pp. 159–168.