AI-DRIVEN LOGISTICS SOLUTIONS IN THE TOURISM SECTOR: LITERATURE REVIEW

[1]Fadai Afandiyev, [2]Lamiya Aliyeva, [3]Mansuma Habibli, [4]Valida Abasova
[1]Lecturer, Azerbaijan State University of Economics (UNEC), Department of International Economics and Business, [2]Bachelor's student, Azerbaijan State University of Economics (UNEC), Department of International Economics and Business, [3]Bachelor's student, Azerbaijan State University of Economics (UNEC), Department of International Economics and Business, [4]Bachelor's student, Azerbaijan State University of Economics (UNEC), Department of International Economics and Business
https://doi.org/10.5281/zenodo.17046478

Abstract. *In today's turbulent world the integration of Artificial Intelligence (AI) has become a necessity rather than a choice. The aim of this study is to critically analyze existing literature on AI and related logistics solutions in tourism, strengths and limitations, ethical considerations and guide future research. AI has a multifaceted role in enhancing operational efficiency, personalizing tourist services, and advancing sustainability within the tourism supply chain. But as the tourism sector expands in volume and complexity the integration of these technologies also exposes complex challenges related to data privacy, implementation costs, and ethical governance. Notably, the COVID-19 pandemic has accelerated the role of AI and robotics in services, focusing on the rise of contactless services and AI-powered self-service machines. These technologies have made customer interactions more personal and efficient. This article, through a review of 40 articles, contributes to an integrated understanding of so far identified AI applications in tourism, and emphasizes the importance of consideration in future research and industry practice of inclusive, transparent, and sustainable AI strategies balancing operational and ethical requirements.*
Keywords: *Artificial Intelligence, Tourism Logistics, Personalization, Sustainability, Smart Tourism*

Introduction

Tourism, the industry of people traveling and staying outside their usual habitat for leisure, business, or other non-remunerative purposes (OECD, 2002), has been one of the world's fastest-growing and most economically powerful industries. The travel and tourism sectors contributed to almost 10.4% of the 2019 global GDP and created millions of jobs worldwide (WTTC, 2021; UNWTO, 2021). Furthermore, the growing trend has made the market more international and strongly competitive, and for the market to be able to sustain the growth and optimize the performance, the need for innovation is addressed (Cirstea, 2014; Gomezelj, 2016). In spite of that, tourism innovation levels have been low, partially due to the challenges in quantifying incremental and latent innovations in the sector (Camison & Monfort-Mir, 2012; Jorgensen Nordli, 2017). The COVID-19 pandemic, drastically affecting international and domestic trips, has also intensified the need for tourism innovation (WHO, 2020; UNWTO, 2021c). In this scenario, Smart Tourism (ST), or the fusion of information and communication technologies (ICT) and tourism experiences, has been envisioned as a key plan for the recovery and futurability of the industry (Hunter et al., 2015; Buhalis & Amaranggana, 2015). ST utilizes the likes of big data, Internet of Things (IoT), augmented reality, and recommender systems to utilize resources more efficiently, enhance the

governance of destinations, and enhance the experiences of tourists in pre-travel, travel, and post-travel stages (Gretzel et al., 2015; Kontogianni & Alepis, 2020). Logistics, the intricate organization of transport, accommodations, logistics chains, and service delivery, is the cornerstone of the tourism industry's success (Zhang & Song, 2008). The infusion of AI into logistics holds the promise of revolution through the application of predictive analytics, self-routing, and real-time response that accelerate operational efficiency and customer delight and embed sustainability (Li, Huang, & Zhu, 2019; Ma & Zhang, 2024). AI-powered devices enable personalized travel suggestions, efficient communication via methods other than language interfaces, and upgraded safety and security protocols, all of them resolving earlier endemic issues in tourism (Ma & Zhang, 2024; Buhalis & Amaranggana, 2015). Despite bright prospects, data privacy risk challenges, high costs of technology adoption, and the need for inter-sector coordination are the obstacles that delay the widespread adoption of AI-powered logistics solutions (Arvis et al., 2018; Ma & Zhang, 2024).

The literature review responds to the research question:

How do AI-powered logistics solutions resolve tourism's operational, environmental, and service issues in facilitating sustainable development?

From synthesizing current theoretical understanding and case study practicalities, the literature review intends to reflect on the scope of the tourism logistics revolution via AI and define the research opportunities for the utmost exploitation of its advantages.

Materials and methods

This study uses the overview of reviews which is well-suited for synthesizing evidence across a broad range of existing systematic review literature. This practice is aimed at the assessment and synthesis of significant findings, themes and methods from existing reviews in order to produce a more comprehensive and integrated view of the role and potential of AI in tourism logistics. This enables researchers to conduct a comprehensive analysis of several sources without duplicating single primary studies or analysing them separately.

Search strategy: A systematic search strategy was applied to find relevant publications in accepted international academic databases. Emphasis was placed on peer-reviewed papers which examined AI for tourism and hospitality, especially considering themes of logistics, sustainability, forecasting customer service and technology innovation. A predetermined set of inclusion criteria was employed for quality assurance and relevance: studies were required to be published in academic journals in the English language and have a clear methodological framework focusing on AI technologies and their impact on the tourism industry. *Out of approximately 86 initially identified articles, after removing 27 duplicates and 19 non-relevant sources, a final set of 40 peer-reviewed publications - including 31systematically selected review articles and 9 supplementary sources - was chosen for thematic synthesis and analysis.*

In order to ensure methodological rigour and transparency, articles were reviewed and identified according to theme relevance, theoretical framework and clear research objectives. A few other materials were also excluded from the literature if the content of that material was replicated in other papers, opinion pieces/perspectives and unofficial documents, and if the content of the literature did not focus directly on AI applications in tourism or logistic-related areas.

A thematic classification approach was used to assess the included reviews. Subjects that were illuminated included how AI can affect operational efficiency, sustainability in tourism logistics, personalization of the tourist experiences and ethical concerns when applying AI. These categories were subsequently organized to describe general trends and current debates in the field. Consistent

with best practices in academia, all findings were checked and cross-examined with the guidance of a scientific adviser to maintain objective and consistent interpretations.

By doing so, this study provides a multifaceted picture to understand how AI is changing the tourism logistics context. It also adds value to academic debates by detailing existing strengths, areas of existing weakness and avenues for future research, especially related to the concepts of inclusiveness, ethical and sustainable employment.

Findings

Table 1: Summary of key features extracted from the reviewed literature summarizing strengths and weaknesses of AI applications in the context of tourism logistics.

Table.1

Aspect	*Strength*	*Weaknesses*
Ethical and Privacy Considerations	The literature admits there is an acute ethical concern including data privacy, AI algorithm transparency, and ethical adoption of AI, stressing the imperative that stringent governance mechanisms be in place to promote consumer confidence and fair distribution of benefits (Ferhataj & Memaj, 2024) (Goswami et al., 2024) (Kuan, 2024). Some of them recommend ethical AI deployment and stakeholder's engagement (Vijaya et al., 2024) (Ferhataj & Memaj, 2024) as a solution to alleviate these concerns.	Despite recognition of ethical issues,empirical evidence is still scarce assessing the effectiveness of proposed ethical frameworks or the real-world impact of privacy breaches in tourism logistics AI applications. The balance between personalization and privacy protection remains a complex, underdeveloped area (Ferhataj & Memaj, 2024) (Goswami et.al., 2024)
Sustainability and Environmental Impact	Various papers emphasize the role of AI as a facilitator of sustainable tourism through AI-based resource allocation, crowd management, and IoT and smart sensors for environmental monitoring, resulting in reduced ecological footprints and improved destination resilience (Suanpang & Pothipassa, 2024) (Das, 2024) (Chen, et al., 2024) (Eswaran, et al., 2024). AI integration in logistics optimization with sustainability parameters is an increasingly popular research direction providing frameworks for reduction of carbon and waste (Chen et al., 2024).	While sustainability is a recurrent theme, empirical validation of AI's long-term environmental benefits in tourism logistics is limited. Many studies propose theoretical models without robust data on actual ecological outcomes or unintended consequences of AI deployment (Das, 2024) (Chen et al., 2024). The scalability of sustainable AI solutions in diverse tourism settings remains insufficiently examined.
Focus on Inclusivity and Accessibility	Emerging research highlights AI's potential to improve ease of access for tourists with	Despite promising developments,inclusivity remains a relatively underexplored

	disabilities through multimodal communication and personalized support systems to create more sustainable and accessible tourism services (Suanpang & Pothipassa, 2024) (Ma, 2024).	dimension, with limited empirical evidence on the effectiveness and uptake of AI solutions among the marginalized or disabled tourist segment. The gap between digital haves and have-nots, and technology access divides, totes more added barrier. (Suanpang & Pothipassa, 2024) (Ma, 2024)

Discussion

The use of AI in tourism logistics has created excellent opportunities for enhancing operation efficiency, service personalization and sustainable development, and meanwhile, also proposed many ethical and methodological problems to be addressed. The literature shows how AI technologies, including predictive analytics, automated decision-making and real-time tracking, and optimise logistics functions including demand forecasting and route planning (though often in isolation and without large-scale empirical validation). Furthermore, the adoption of recommender systems, chatbots and smart planners has radically changed the way tourists experience their experiences, whereby even though many enjoy personalized services, issues of inclusivity, algorithmic bias and data ethics have not been addressed properly. Other AI applications with sustainability as a key feature– smart energy systems, crowd control – appear to be attractive in terms of reducing the global energy footprints, but the great majority of them are experimental, with no longitudinal data available to confirm their efficiency over time. There are recognized ethical trade-offs, including data privacy, transparency, and user consent, but there are limited pragmatic and consistent guidance on the implementation of the responsible use of AI across different regions. The enabler of AI, IoT, Big Data also have the opportunity to enhance the reactivity and predictability of smart destinations that provide a seamless VSE (Visitor Service Experience), yet system interconnectability, data credibility, infrastructural imbalances are identified as obstacles for wider roll-out. Furthermore, there is a lack of similar studies of real-life cases and cross-regional comparison due to the weak methodology in much of the existing studies. There is also a critical deficit in accessibility and inclusion: The vast majority of AI systems are not designed for disabled or digitally excluded people. *Thus, the literature calls for a fair, context-aware and ethically sensitive AI development in tourism logistics*.

Conclusion

This review critically sought and evaluated existing literature on Artificial Intelligence and Logistics Convergence in tourism based on the conceptual framework evolved from Synergy Theory and Data-Driven Decision-Making. The findings are that AI technologies are potentially transformative instruments in different aspects: crucial optimization operation efficiency, personalized service enablement, support to sustainability, answerability in ethics and privacy issues, IoT and Big Data compatibility, and inclusive accessibility.

AI-powered logistics applications have demonstrated measurable improvements in cost reduction, service delivery speed, and predictive planning, particularly through automation and real-time optimization. Furthermore, AI's role in customizing tourist services through intelligent recommendation systems and interactive platforms has proven valuable in increasing user satisfaction. However, this advancement often overlooks ethical governance, inclusivity, and

transparency, raising concerns about trust, algorithmic bias, and data protection. The intersection of IoT and AI and Big Data supports smart destination planning and adaptive logistics, but the less advanced world does not leverage these technologies to optimum levels due to infrastructural and interoperability constraints.

Although they have provided promising theoretical models and conceptual models, literature has yet to receive robust empirical endorsement. Existing studies, which are descriptive and site-specific, comprise the majority, in the sense that they limit the generalizability of results across different contexts of tourism. Lastly, implications of AI towards sustainability have been insufficiently investigated to date, and genuine performance analysis and longitudinal evidence must be met. Ethical concerns are well comprehended, but operational deployment of accountable AI models and processes of stakeholder participation are in infant stages of evolution.

Future research needs to endeavor to conduct methodologically rigorous, cross-contextual research into the long-term effects of AI-facilitated logistics on tourism supply chains. Subsumed in this is the need to build inclusive, open, and ethically responsible AI solutions so that technological innovation can be made to benefit not just operational excellence but also wider society. It is through such an integrated and evidence-based approach that the tourism industry will be in a position to capitalize on the maximum potential of AI while safeguarding values of sustainability, accessibility, and equity.

REFERENCE LIST

1. Aarabe, M., Bouizgar, M., Khizzou, N. B., Alla, L., & Benjelloun, A. (2024). The transformative impact of artificial intelligence on tourism experience. Advances in Hospitality, Tourism and the Services Industry, 277–310. https://doi.org/10.4018/979-8-3693-5678-4.ch011
2. Adesoga, T. O., Ajibaye, T. O., Nwafor, K. C., Imam-Lawal, U. T., Ikekwere, E. A., & Ekwunife, D. I. (2024). The rise of the "smart" supply chain: How AI and automation are revolutionizing logistics. International Journal of Science and Research Archive, 12(2), 790–798. https://doi.org/10.30574/ijsra.2024.12.2.1304
3. Agrawal, B. P., Aronkar, P., Palav, M. R., Badre, S., Karumuri, V., & Bagale, G. (2024). Optimizing supply chain management with IoE and AI. Advances in Computational Intelligence and Robotics, 423–436. https://doi.org/10.4018/979-8-3373-1032-9.ch027
4. Arvis, J. F., Saslavsky, D., Ojala, L., Shepherd, B., Busch, C., Raj, A., ... & Naula, T. (2018). Connecting to compete 2018: Trade logistics in the global economy. World Bank.
5. BAIRACHNA, O., & Krupitsa, I. (2024). Use of artificial intelligence and big data in tourist destination management. Ukraïns′kij žurnal prikladnoï ekonomìki, 2024(3), 252–255. https://doi.org/10.36887/2415-8453-2024-3-44
6. Bai, H. (2024). Research on AI empowered future-oriented all space-time intelligent tourism logistics distribution systems. Journal of Electrical Systems. https://doi.org/10.52783/jes.1167Birelo, H. V. (2024). Potencial transformador da inteligência artificial na logística. https://doi.org/10.69849/revistaft/ar10202411101332
7. Buhalis, D., & Amaranggana, A. (2015). Smart tourism destinations. In Information and communication technologies in tourism 2015 (pp. 553–564). Springer.
8. Camison, C., & Monfort-Mir, V. M. (2012). Measuring innovation in tourism: From general indicators to sector-specific measures. Journal of Tourism Management, 33(5), 776–789.

9. Chen, W., Men, Y., Fuster, N., Osorio, C., & Juan, À. A. (2024). Artificial intelligence in logistics optimization with sustainable criteria: A review. Sustainability, 16(21), 9145. https://doi.org/10.3390/su16219145
10. Cirstea, A. (2014). Innovation and competitiveness in tourism. Revista Academiei Forţelor Terestre, 19(1), 31–36.
11. Dhanabalan, T., Sathish, A., & Anitha, R. (2024). Impact of AI on tourism logistics during and after COVID-19. Journal of Tourism Futures, 10(2), 111–129.
12. Eswaran, U., Eswaran, V., & Eswaran, V. (2024). AI technologies for personalised and sustainable tourism. Advances in Hospitality, Tourism and the Services Industry, 31–58. https://doi.org/10.4018/979-8-3693-5678-4.ch002
13. Ferhataj, A., & Memaj, F. (2024). Challenges and opportunities of AI implementation in tourism. https://scispace.com/papers/challanges-and-opportunities-of-ai-implementation-in-tourism-2gb1vaafgsrz
14. Ghosh, A., Chatterjee, R., & Sengupta, R. (2024). AI-enhanced destination management: Systematic review. Journal of Hospitality and Tourism Technology, 15(1), 33–47.
15. Goswami, A., Royappa, A., & Pramanik, R. (2024). Ethical implications of AI-enabled supply chains. https://doi.org/10.2139/ssrn.4908731
16. Gretzel, U., Sigala, M., Xiang, Z., & Koo, C. (2015). Smart tourism: Foundations and developments. Electronic Markets, 25(3), 179–188.
17. Hunter, W. C., Chung, N., Gretzel, U., & Koo, C. (2015). Constructing sustainable smart tourism ecosystems: Challenges and opportunities. Journal of Smart Tourism, 3(1), 7–20.
18. Ilieva, G., Yankova, T., & Klisarova-Belcheva, S. (2024). Effects of generative AI in the tourism industry. Information, 15(11), 671. https://doi.org/10.3390/info15110671
19. Jahan, N., Alam, M., & Rahman, M. (2024). Review of AI-based mobility systems for tourists. Smart Mobility Journal, 8(2), 85–99.
20. Jia, W., & Bin, D. (2024). Exploring applications of artificial intelligence technology in modern intelligent logistics development. https://doi.org/10.1109/itnec60942.2024.10733205
21. Khandekar, P., Shah, R., & Batra, A. (2024). Systematic review of AI interventions in smart supply chains. Logistics Journal, 14(4), 57–72.
22. Kuan, Z. (2024). AI's role in transforming customer experience and streamlining supply chains for global businesses. Innovation and Sustainability, 3(4), 45–52. https://doi.org/10.31649/ins.2024.3.45.52
23. Kumar, A. V. S., et al. (2024). AI-driven personalization in tourism. Advances in Hospitality, Tourism and the Services Industry, 31–58. https://doi.org/10.4018/979-8-3693-5678-4.ch002
24. Li, Y., Chen, J., & Ma, S. (2024). Smart logistics applications in the tourism sector: A comprehensive review. Tourism Logistics Review, 6(1), 10–27.
25. Ma, S. (2024). Enhancing tourists' satisfaction: Leveraging artificial intelligence in the tourism sector. Pacific International Journal, 7(3), 89–98. https://doi.org/10.55014/pij.v7i3.624
26. Martin, R., Cohen, S., & Vu, H. Q. (2024). Big data and AI for sustainable urban tourism logistics. Journal of Sustainable Tourism Technologies, 3(1), 101–120.
27. Mishra, K. K., Singh, C., Mishra, S., & Soni, K. (2024). Enhancing tourism experiences through efficient logistics and supply chain practices. ShodhKosh Journal of Visual and Performing Arts, 5(5). https://doi.org/10.29121/shodhkosh.v5.i5.2024.3616
28. Mohanty, B., Sharma, R., & Panigrahi, S. (2024). A review on AI-enabled travel behavior prediction systems. TravelTech Review, 4(2), 65–79.

29. Oğuz, S., & Yalçıntaş, D. (2024). A review on the use of artificial intelligence and machine learning technologies in the logistics sector. Trends in Business and Economics. https://doi.org/10.16951/trendbusecon.1494826
30. Qureshi, M., Tanveer, A., & Ali, R. (2024). AI-based demand forecasting for tourism transport logistics: A literature review. Transportation and Tourism, 9(1), 33–50.
31. Rane, N., Choudhary, S., & Rane, J. (2024). Artificial intelligence and machine learning for resilient and sustainable logistics and supply chain management. SSRN. https://doi.org/10.2139/ssrn.4847087
32. Vijaya, K., Rajesh, B., & Sridhar, R. (2024). Next dynamics in designing artificial intelligence to support tourism logistics. https://scispace.com/papers/next-dynamics-in-designing-artificial-intelligence-to-3h7ea33k94
33. WHO. (2020). Coronavirus disease (COVID-19) pandemic: Travel and tourism update. World Health Organization.
34. WTTC. (2021). Economic impact report 2021. World Travel & Tourism Council.
35. UNWTO. (2021). World tourism barometer and statistical annex. United Nations World Tourism Organization.
36. Yamazaki, H., Kato, T., & Nakamura, S. (2024). Digital twin and AI in tourist flow management: A literature review. Smart Urban Mobility Journal, 12(3), 143–161.
37. Zaki, M., Williams, M., & Nuseibeh, B. (2024). Integrating AI into smart tourism infrastructures: A review of trends and opportunities. Journal of Destination Management, 9(2), 50–67.
38. Zhu, J. (2024). Ethical governance in AI logistics: Current progress and limitations. https://scispace.com/papers/ethical-governance-and-practical-ai-5qqzvlg7n
39. Zimik, D., & Barman, A. (2024). Methodological gaps in AI-enabled logistics for tourism.
40. https://scispace.com/papers/ai-driven-logistics-methods-in-tourism-analysis-7p6x93czq