Tourism and Sustainability: Exploring the Role of AI-Driven Tourism Practices in Shaping Consumer Sustainable Behaviour

Kristina Grumadaitė,[1] Sebin Thomas Babu,[1]
Sonny Jose[2]
[1] St. Ignatius of Loyola College, Kaunas, Lithuania
kristina.grumadaite@ilk.lt, sebin.thomas.babu@ilk.lt
[2] Loyola College of Social Sciences, Thiruvananthapuram, India
sonny.jose@gmail.com

The actors of the tourism industry worldwide keep implementing more digital solutions into the tourism services, including artificial intelligence (AI) tools to improve travel planning, pricing, marketing and other business functions, and to increase the quality of tourism experience. Sustainability, on the other hand, is of significant importance in order to maintain economic efficiency, social equity and ecological consideration. However, various gaps and inconsistencies between providing and using AI and sustainable tourism services are noticed. Thus, this paper aims to analyse the scope of cohesion between AI application and sustainability practices in the sector. The exploratory empirical research revealed that AI still plays a limited role in shaping the sustainable behaviour of the consumers of tourism services.

DOI
https://doi.org/10.18690/um.epf.5.2025.57

ISBN
978-961-286-984-7

Keywords:
tourism practices, sustainability, Artificial Intelligence (AI), consumer behaviour, India, Lithuania, Generation Z, Generation Y

JEL:
D91, Q01, Q55

University of Maribor Press

1 Introduction

Among technological advancements, artificial intelligence (AI) becomes a force, which provides new opportunities and operational efficiencies in the tourism sector, including increasing sustainability and shaping sustainable behaviour of the consumers of tourism services (Siddik, Forid, Yong, Du & Goodell, 2025). However, the scientists acknowledge that the development of sustainable tourism itself is not quite clear. Accordingly, it is not simple to define, how particular technologies could have an impact towards sustainable tourism (Majid, Tussyadiah, Kim & Pal, 2023). On the other hand, AI is also a complex phenomenon, still in its experimental stage (Florido-Benítez & del Alcázar Martínez, 2024), thus the consumers of tourism services may also have various experience levels and expectations regarding AI. One should state that scientific literature gives much attention to the presentation of AI significance regarding sustainability practices (for example, Ionescu & Sârbu, 2024; Shuai & Karia, 2024). However, there is a scarcity of scientific research on the relationship of AI, tourism services and sustainable behaviour starting at industrial level and ending at individual (consumer) level. Even more, the research to analyse and compare the contexts with socio-economic and cultural differences regarding AI-driven tourism practices and consumer sustainable behaviour would be of a great significance.

Thus, ***the scientific research problem*** could be formulated as follows – what is the role of AI-driven tourism practices in shaping consumer sustainable behaviour?

The aim of the paper is to define how AI-driven tourism practices shape consumer sustainable behaviour.

In the theoretical part of the paper, the main concepts of sustainability and AI are explained, the scope of application of AI in tourism regarding sustainability is revealed and the main challenges regarding consumer behaviour in adapting AI approaches, which could lead to sustainable tourism practices, are presented. ***In the methodological part***, research methods are presented. In the ***Result and discussion parts*** the main trends regarding consumer behaviour in connection to sustainability and AI are defined.

Research methods: scientific literature analysis, case analysis, semi-structured interviews and thematic analysis.

2 Theoretical Background / Literature Review

Sustainable tourism balances between the three fundamental pillars of sustainability – environmental, social and economic (Butler, 1999) in meeting human needs while also tending to ecological needs (Rastegar, Higgins-Desbiolles & Ruhanen, 2023). Based on the framework introduced by UNEP and WTO (2005), the aims for the sustainable tourism include economic viability, local prosperity, employment quality, social equity, visitor fulfilment, local control, community wellbeing, cultural richness, physical integrity, biological diversity, resource efficiency and environmental purity.

Sustainable consumers of tourism services could be characterised by behaviour, which is environmentally sustainable, i.e., such individuals don't have an adverse effect on natural environment and responsibly engage in sustainable tourism practices, while prioritizing environmental protection and sensitivity (Saltik & Akova, 2024).

AI-driven tourism practices can be defined as the integration of technology and tourism, where autonomous systems without a human control are utilized to enhance and streamline travel experiences, by offering efficient and convenient solutions for travellers (Shuai & Karia, 2024). The authors define the following expressions of AI in tourism: visitor-facing online services and offline service equipment and facilities; AI tour guide service; chatbots and voice assistants; language translation applications; Map Apps; facial recognition; robots and smart travel assistants; VR/AR/MR (headsets); forecasting systems (Ionescu & Sârbu, 2024; Shuai & Karia, 2024).

The implementation of these technologies makes an impact at *industrial*, *business* and *consumer* levels. *At industrial level*, AI is capable of replicating human intelligence and developing mechanical, analytical, intuitive, and empathic intelligence (Shuai & Karia, 2024). Tourism enterprises use biometric, emotional data of tourists by employing AI for generating trends in consumption, income, business opportunities and threads (Doborjeh, Nigel, Doborjeh & Kasabov, 2022) in order to meet unique

consumer needs and increase consumer loyalty and satisfaction (Shuai & Karia, 2024). At *consumer level*, AI can predict and understand tourists' preferences, thus enhancing their overall satisfaction through customized services.

One should state that AI usage to support sustainability initiatives may have a significant impact *at societal level* as well through the optimization of the allocation of resources, improving the management of waste, contributing to energy consumption, reducing the industry's ecological footprint, improving health measures, generating corporate social responsibility, decreasing the destruction of cultural heritage sites (Elkhwesky, El Manzani & Salem, 2024; Lv, Shi & Gursoy, 2021).

However, Patrichi (2024) emphasises the need for the improvement of AI adaptation in sustainability practices, especially data quality and availability, algorithmic transparency and interpretability, enhancing trust and accountability in the decision-making process. One should state that because AI includes various data and sensitive information, it is difficult to provide the necessary security from cyberattacks and other violations of privacy (Florido-Benítez & del Alcázar Martínez, 2024). According to Kelly & Lawlor (2021), the tourists may be reluctant to share their private data and use smart technologies because of particular perception, attitudes and experience regarding AI. Finally, the attitudes and experience regarding sustainable practices is also uneven among the consumers of tourism services (Holmes, Dodds & Frochot, 2021).

Thus, in the next parts of this paper the research methodology and empirical research results will be presented in order to analyse the aspects of AI-drive tourism services and sustainable behaviour.

3 Methodology

The aim of the empirical research was to define the main trends regarding AI-driven tourism practices to choose sustainable behaviour in India and Lithuania. Those countries were chosen because of their differences in socio-economic and technological development, and cultural differences (Western vs. Eastern approach). **The research objectives** were as follows: 1) to reveal the availability of AI in tourism services from the perspective of research participants; 2) to find out the

attitudes of research participants regarding sustainability in tourism; 3) to analyse the willingness of research participants to use AI to possess a sustainable behaviour.

Semi-structured interview's method was chosen in order to reveal current realia regarding AI and sustainable behaviour without asking the respondents to choose predefined statements. Based on the research objectives, the following questions were prepared: 1) How do you notice AI while using various tourism services (including accommodation, dining, shopping, transportation, excursions, other activities)? 2) Do you purposefully use some AI tools while ordering and (or) using tourism services? Why? Why not? 3) How important is it for you to use sustainable tourism services? Why? 4) Do you use AI tools to order/use sustainable tourism services? If not, would you wish to use them? In which areas? 5) What do you think, how do AI tools help you to promote sustainable tourism services? Please provide some examples.

The research was *exploratory* in nature, mainly concentrating on the representatives of late Generation Y (born 1990-1996) and early Generation Z (born 1997-2000), scientifically seen as individuals, depending on intense technology adaptation and significantly positive attitudes towards sustainability (Çalışkan, 2021). The respondents were chosen as particular cases. They are working in the tourism sector or teaching tourism subjects (teachers) or studying tourism topics (thus, having particular understanding regarding sustainability and application of smart technologies in the tourism area). Additionally, some of them are enthusiastic travellers, which are in need to get particular tourism services, and (or) individuals, who are using various AI technologies in their work and personal life. Six respondents from India and six respondents from Lithuania with above stated characteristics were chosen for the interviews. Respondents were informed about the anonymity of the empirical research data and the possibility to withdraw from the research at any time. Every respondent was coded, noting them as Respondent A, Respondent B, etc., adding LT (Lithuanian) or IN (Indian). The interviews took place online. 6 Indian respondents and 5 Lithuanian respondents participated in the research. The answers were transcribed. Thematic analysis for the content of the answers was used.

4 Results

AI in tourism services. The respondents both from India and Lithuania recognise AI in various apps (for example, travel apps), restaurant /dining search algorithms, websites of tourism services (including advertisements) and especially chat boxes, when they give the questions and are provided with answers (Respondent A_LT, Respondent E_IN, Respondent G_IN). However, some respondents emphasised that there is "not enough AI in the tourism sector" (Respondent H_IN).

The willingness of the respondents to use AI in tourism services. Mostly, the respondents are using AI while searching more information for a particular place (Respondent A_LT), planning the route (Respondent A_LT, Respondent F_LT, Respondent E_IN, Respondent G_IN), dining services (Respondent D_IN, Respondent E_IN), accommodation (Respondent E_IN, Respondent F_LT). As Respondent E_IN, while providing various examples of AI application, noted: "AI makes everything smoother and more personalized".

However, some respondents don't use AI at all (on purpose, as in the case of Respondent B_LT, or simply because not seeing adequate options, as in the case of Respondent C_LT, Respondent H_IN, Respondent I_IN).

The significance of sustainability. The respondents in general emphasised the importance of sustainability while applying waste/garbage management (Respondent B_LT, Respondent C_LT, Respondent E_IN), buying reusable products / less plastic (Respondent C_LT, Respondent_E), driving an electric car (Respondent C_LT), supporting local communities (Respondent_E_IN), using eco-friendly services (Respondent E_IN).

The respondents also emphasised the importance of sustainable practices as a tool to preserve this world for future generations / for the next generation travellers (Respondent D_IN, Respondent E_IN, Respondent G_IN, Respondent I_IN), to decrease negative impact to the environment / make the environment clean (Respondent_E_IN, Respondent F_LT). Respondent J_LT, noted that they "prefer tourism services which provide and encourage sustainable practices". However, there was one respondent, who "is not concerned about sustainability" (Respondent

A_LT), but it shouldn't be evaluated negatively because this respondent simply is not convinced about the portrayal of sustainable services as such.

AI in shaping sustainable behaviour. The research results revealed that the AI application regarding sustainability in the tourism sector looks limited. The respondents even revealed the concerns that "not everything that looks sustainable, is really sustainable" (for example, Respondent A_LT and Respondent B_LT). The most of respondents didn't use AI specifically for sustainable tourism, even if they wished to (for example, Respondent C_LT, Respondent D_IN, Respondent E_IN, Respondent F_IN, Respondent H_IN, Respondent I_IN, Respondent K_IN). Respondent G_IN, for example, tried using it but "didn't succeed that much". Two respondents mentioned that they used AI in the case of sustainable accommodation but only in a limited way (Respondent I_IN, Respondent J_IN).

5 Discussion

Empirical research revealed that despite a variety of the options of AI application areas, the respondents both from India and Lithuania mostly revealed very few and quite simplified examples of AI application, including chatbots, virtual assistants, some travelling or restaurant searching algorithms. Accordingly, the practical usage of AI in the tourism sector looked also somehow simplified with some exceptions, taking into account that some respondents even don't see any purpose to use AI. One should mention that hospitality education of respondents highly increases the knowledge and ability to notice AI and sustainability opportunities (Respondent E_IN, Respondent F_LT).

In general, both Lithuanian and Indian respondents emphasise the importance of sustainability, however, some differences in the approach regarding sustainability based on different cultures were noticed. Lithuanian respondents emphasised the importance of sustainability in a *current* world (for example: "I contribute to a more sustainable world (*now*)" – Respondent B_LT), while Indian respondents emphasise future generations (as Respondent D_IN noted, "it is extremely important to keep the nature as it is or better for the coming generations"). These answers of Indian respondents reflect the deeply rooted sense of sustainability and community approach.

Most of the respondents confirmed that they didn't use AI regarding sustainable tourism services, or tried to use but not very successfully. However, the respondents have a lot of ideas how to apply AI in shaping sustainable behaviour (planning sustainable trips, accommodation, choosing eco-friendly options, community led travels or finding eco-friendly hotels on a budget friendly level, finding natural resources in the local area, etc.). In addition, more knowledge is needed in order to use AI: "providing much information and options about it" (Respondent J_LT). These ideas come from their education and curiosity to learn more. Thus, one should state that the development and education regarding AI and sustainability should be intensified. Scientific literature also emphasises that various actors in the tourism sector, especially smaller ones, are still lacking AI and other modern digital technologies to influence sustainable practices (Shuai & Karia, 2024).

Research limitations and future research opportunities. The interviews with 11 respondents are providing only the primary insights, however, they help to notice particular realia and behavioural trends. Future research could be performed at industrial, business and consumer levels in different socio-economic and cultural contexts, including the preparation and scope of tourism service providers to apply AI in forming sustainable consumer behaviour; adaptation of different AI tools in different tourism services (including tourism development in peripheral regions); analysis of attitudes and behaviour of the individuals of different generations towards AI-driven tourism services and sustainable tourism practices (including the factors and prerequisites of AI application in shaping sustainable behaviour). In order to maintain a statistical reliability, qualitative and quantitative research methods should be combined. There is a need for a longitudinal study as well, to analyse the changes of AI role in shaping sustainable behaviour among different generations and contexts.

6 Conclusions

1. Scientific literature emphasises various advantages of AI in shaping sustainable behaviour of the consumers of tourism services, including resource optimization and environmental protection, which covers AI-powered environmental monitoring, optimizing resource usage, waste management, protecting sensitive ecosystems, sustainable transportation; enhancing traveller experiences and promoting responsible behaviour

which includes personalized recommendations, AI-powered chat-bots, smart tourism apps, virtual tours; strategic planning and decision-making, which covers tourism demand forecasting, data analysis, monitoring tourist flows, building smart cities and enhancing destination competitiveness.

2. However, exploratory empirical research, based on the interviews with the respondents, which are born between 1990 and 2000 and residing in Lithuania and India, revealed that despite the significance of sustainability in respondents' lives, AI application in shaping a sustainable behaviour of the respondents is still very limited or unknown, including AI opportunities in the tourism sector in general. Since the respondents showed a willingness to use AI while discovering sustainable tourism services, both science and business representatives should search for the adequate and complex ways to employ AI in the tourism sector on purpose to increase sustainability.

References

Butler, R. (1999). Sustainable tourism: A state-of-the-art review. *Tourism Geographies*, 1(1), 7–25. https://doi. org/10.1080/14616689908721291

Doborjeh, Z., Nigel, H., Doborjeh, M., & Kasabov, N. (2022). Artificial Intelligence: A Systematic Review of Methods and Applications in Hospitality and Tourism. *International Journal of Contemporary Hospitality Management*, 34(3), 1154–1176. https://doi.org/10.1108/IJCHM-06-2021-0767.

Elkhwesky, Z., El Manzani, Y., & Salem, I. E. (2024). Driving Hospitality and Tourism to Foster Sustainable Innovation: A Systematic Review of COVID-19-Related Studies and Practical Implications in the Digital Era. *Tourism and Hospitality Research*, 24(1), 115–133. https://doi.org/10.1177/14673584221126792.

Florido-Benítez, L., & del Alcázar Martínez, B. (2024). How Artificial Intelligence (AI) Is Powering New Tourism Marketing and the Future Agenda for Smart Tourist Destinations. Electronics, 13, 4151. https://doi.org/10.3390/ electronics13214151.

Holmes, M. R., Dodds, R., & Frochot, I. (2021). At home or abroad, does our behavior change? Examining how everyday behavior influences sustainable travel behavior and tourist clusters. *Journal of Travel Research*, 60(1), 102-116. https://doi.org/10.1177/0047287519894070.

Ionescu, A.-M., & Sârbu, F. A. (2024). Exploring the Impact of Smart Technologies on the Tourism Industry. *Sustainability*, 16(8), 3318. https://doi.org/10.3390/su16083318.

Kelly, P., & Lawlor, J. (2021). Adding or destroying value? User experiences of tourism self-service technologies. *Journal of Hospitality and Tourism Insights*, 4(3), 300–317. https://doi.org/10.1108/JHTI-08-2018-0051.

Lv, H., Shi, S., & Gursoy, D. (2021). A Look Back and a Leap Forward: A Review and Synthesis of Big Data and Artificial Intelligence Literature in Hospitality and Tourism. *Journal of Hospitality Marketing & Management*, 31(2), 145–175. https://doi.org/10.1080/19368623.2021.1937434.

Majid, G. M., Tussyadiah, I., Kim, Y. R., & Pal, A. (2023). Intelligent automation for sustainable tourism: a systematic review. *Journal of Sustainable Tourism*. https://doi.org/10.1080/09669582.2023.2246681.

Patrichi, I. C. (2024). Evaluating Climate Change Adaptation Strategies for Sustaining Mountain Tourism in The Austrian Alps. *Romanian Economic Business Review*, Romanian-American University, 19(1), 36–45.

Rastegar, R., Higgins-Desbiolles, F., & Ruhanen, L. (2023). Tourism, global crises and justice: rethinking, redefining and reorienting tourism futures. *Journal of Sustainable Tourism*, 31(12), 2613–2627. https://doi.org/10.1080/09669582.2023.2219037.

Saltik, Z., & Akova, O. (2024). The perception over environmental issues: the impact on environmentally sustainable tourist behavior. *Asia Pacific Journal of Tourism Research*, 29(10), 1187–1203. https://doi-org.ezproxy.ktu.edu/10.1080/10941665.2024.2398697

Shuai, W., & Karia, N. (2024). AI tourism: Concepts, practices, challenges and future. *Global Business and Management Research: An International Journal,* 16(4), 475-491.

Siddik, A. B., Forid, M. Sh., Yong, L., Du, A. M., & Goodell, J. W. (2025). Artificial intelligence as a catalyst for sustainable tourism growth and economic cycles. *Technological Forecasting and Social Change*, 210, 123875. https://doi.org/10.1016/j.techfore.2024.123875.

UNEP & WTO (2005). Making tourism more sustainable (English version). United Nations Environment Programme and World Tourism Organization. https://doi.org/10.18111/9789284408214.

Çalışkan, C. (2021). Sustainable Tourism: Gen Z? *Journal of multidisciplinary academic tourism*, 6 (2), 107–115. https://doi.org/10.31822/jomat.2021-6-2-107.