

Research Article

An Assessment of Sustainable Practices in the Hospitality Industry in Kaduna, Metropolis, Nigeria

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ABSTRACT

This research sought to investigate sustainable practices in the hospitality industry in the Kaduna metropolis. The specific objectives included an assessment of the level of awareness and implementation of sustainable practices in the hospitality industry in the Kaduna metropolis and an assessment of the perceived benefits and challenges associated with the implementation of sustainable practices. This research was guided by the Triple Bottom Line (TBL) theory, which was developed by John Elkington in 1994. In this study, descriptive and inferential statistics were used to analyse the data obtained from a structured questionnaire using purposive sampling. The results revealed that although hospitality businesses in Kaduna Metropolis have started implementing green practices, the level of implementation is still considered moderate. It was established that hotels that implement green practices are likely to increase customer satisfaction, improve their reputation, and increase profitability because of cost reduction. Although green practices in hospitality businesses in Kaduna Metropolis, Nigeria, were identified as a challenge because of high investment costs, a lack of customer awareness, and inadequate skills, the study established that green practices enhance profitability in the long term, thereby improving competitiveness in the market. Therefore, the government should consider offering financial incentives, such as grants, soft loans, and tax relief, to hotels that implement green practices, such as energy-saving equipment, water-saving devices, and solar power, to reduce the high cost of implementation, which was identified as a challenge in implementing green practices in the hospitality industry in Kaduna Metropolis, Nigeria.

ARTICLE HISTORY

Submitted 29 January 2026
Accepted 25 March 2026
Published 27 March 2026

GUEST EDITOR

A. M. Ahmed

KEYWORDS

Sustainable hospitality, Green practices, Triple bottom line, Kaduna metropolis, Hotel industry, Nigeria

1 Introduction

The hospitality industry plays a significant role in the global economic development process, contributing significantly to employment generation, income generation, and growth in international tourism (United Nations World Tourism Organization [UNWTO], 2020; World Travel & Tourism Council [WTTC], 2021). However, the growth of hospitality businesses worldwide has led to increased levels of energy consumption, resource depletion, the generation of waste, and environmental degradation (Varga, 2010; Zam, 2023). In this context, the integration of sustainable practices has become a key strategic imperative for hospitality businesses, allowing them to achieve a balance between business success and social responsibility (Streimikiene et al., 2020; Becken & Hughey, 2020).

Sustainable hospitality involves a holistic approach that incorporates operational practices, environmental protection, customer experience, and social responsibility (Elkhwesky et al., 2022). The implementation of green practices, such as the installation of energy-saving lightbulbs, water-saving devices, and the purchase of green cleaning products, as well as the reduction of waste, not only helps protect the environment but also improves competitiveness, strengthens brand image, and

increases the profitability of the organization in the long term (González-Rodríguez et al., 2020; Monzon Po, 2022). Despite the documented benefits, hotels, particularly in developing urban areas, tend to suffer from many obstacles that are detrimental to the success of sustainable practices, such as high initial costs of investment, inefficient infrastructure, insufficiently trained personnel, and a lack of awareness among stakeholders (Mensah, 2020; Babagbale et al., 2019; Budeanu et al., 2021).

While emerging studies exist, detailed empirical assessments using TBL in Kaduna hotels remain limited. Therefore, this study uses the Triple Bottom Line (TBL) framework by Elkington (1994), which suggests that the potential for sustainable practices lies in the integration of economic, social, and environmental performance. This study seeks to measure the contributions of green initiatives to social, environmental, and economic profitability in the hospitality industry from a TBL perspective.

Therefore, the purpose of this study is to (i) ascertain the level of adoption of green initiatives in the hotels of the Kaduna Metropolis, (ii) evaluate the benefits of sustainable initiatives, and (iii) assess the factors that impede the effective adoption of green initiatives. This study aims to complement the growing body of literature

on the integration of sustainability in urban hospitality and provides a framework for addressing SDGs 3, 11, 12, and 13 (United Nations, 2015), which target sustainable urban development.

2 Theoretical Framework and Literature Review

2.1 Theoretical Framework: Triple Bottom Line Theory

In this paper, sustainability in the hospitality industry is evaluated using the triple bottom line (TBL) theory developed by John Elkington in 1994. Most businesses focus on a profit-only strategy, but the TBL encourages a more balanced focus across 3 dimensions: profit, people, and the planet. Elkington (1994) and Streimikiene et al. (2020) argue that the most successful companies in the long term will be those that integrate the pursuit of profit with social and environmental responsibilities.

Within the hospitality industry, the TBL framework evaluates sustainable practices such as energy efficiency, water conservation, waste management, local sourcing, and organic products. TBL assesses practices in the hospitality industry that enhance financial contributions as well as customer satisfaction, community prosperity, and environmental protection (González-Rodríguez et al., 2020; Monzon Po, 2022). The TBL framework within the hospitality industry focuses on the interdependence of social, economic, and environmental factors. The TBL framework within the hospitality industry recognizes that businesses have responsibilities beyond shareholders. Sustainability requires accountability, transparency, and reporting (Becken & Hughey, 2020; United Nations, 2015). The TBL framework focuses on managerial decisions, operational effectiveness, and the extent of green practices adopted in hotels in Kaduna Metropolis.

2.2 Awareness and Implementation of Sustainable Practices

Empirical research also suggests that awareness and practice of sustainable practices are increasing in the hospitality industry worldwide. According to Idoko et al. (2025), in the case of Lokoja, Kogi State, Nigeria, for example, the level of structured waste disposal was found to be low (73%), as were the levels of implementing energy-saving practices (68%). In another case, in Adamawa State, Ndalnamu et al. (2024) reported that environmentally sustainable practices significantly increase customer satisfaction.

In another case, in Ilorin, Kwara State, Meduna et al. (2024) reported that even though the hospitality businesses in the area were practicing sustainable social, environmental, and economic practices, certain practices, such as waste recycling and higher employee remuneration, were not entirely consistent, which could affect customer satisfaction positively. In South Africa, Lukose and Agbeyangi (2024) reported that ICT literacy

and awareness of sustainable practices positively affect the adoption of green practices in small-scale hospitality businesses in the region. According to Camilleri and Daitai (2023), awareness and stakeholders are important in implementing sustainable tourism practices in the hospitality industry.

In the Philippine setting, Monzon Po (2022) established that small and medium-sized accommodations that were actively engaged in sustainable practices were able to achieve efficiency and gain a competitive advantage despite financial and knowledge constraints. Moreover, in southwest Nigeria, Adewale and Arowosafe (2022) established a significant link between guests' preference for green practices and their awareness, age, education level, and marital status. This underlines the importance of customer-focused sustainable practices. Another study by Oriade (2021) in the United Kingdom revealed that hotels with a highly sustainability-oriented organizational culture exhibited higher employee and customer satisfaction.

2.3 Benefits and challenges of implementing green practices

Sustainable practices have numerous benefits for hospitality businesses. These include increased patronage, customer satisfaction, reduced costs of operation, improved reputation, and environmental sustainability, among others, as noted by various researchers (Serio et al., 2025; Emad & Omar, 2023; Kade, 2019). For example, González-Rodríguez et al. (2020) reported that eco-friendly practices are essential for increasing customer loyalty, hence increasing a business's market share. In contrast, some stakeholders believe that sustainable practices do not significantly benefit the business, as noted by Okeke and Nwosu (2021).

Despite the numerous benefits of sustainable practices, some hospitality business owners face various challenges, including the high costs of implementing sustainable practices, poor infrastructure, customer awareness, and lack of expertise among employees, as noted by various researchers (Mensah, 2020; Babagbale et al., 2019; Budeanu et al., 2021). The poor enforcement of regulations by the government also makes it difficult to implement sustainable practices, as noted by Becken and Hughey (2020).

2.4 Knowledge Gap and Study Relevance

Although past studies have identified the awareness, benefits, and challenges of green practices, little research has been conducted on the impact of green practices on business performance and customer satisfaction within Kaduna Metropolis. Therefore, this study attempts to bridge this gap by using the TBL approach to measure the level of adoption, benefits, and challenges of green practices and by making recommendations to improve the

sustainability and profitability of businesses in the hospitality industry.

3 Materials and Methods

3.1 Study Area

The Kaduna Metropolis is located in the northwestern part of Nigeria and is the administrative capital of the state of Kaduna. In terms of geographical location, the metropolis falls between 10°20'N and 10°40'N and between 7°20'E and 7°45'E (Ojonuba et al., 2025). The study area is influenced by seasonal winds that blow from the Northeast-Tropical Continental (cT) and from the southwest tropical Maritime (mT). The rainy season normally starts in April, increases gradually to its peak in August, then decreases until September and ceases by the end of October (Abubakar et al., 2025), with the mean annual temperature exceeding 34 °C during the hottest months (March–April) (Muhammad & Abubakar, 2025).

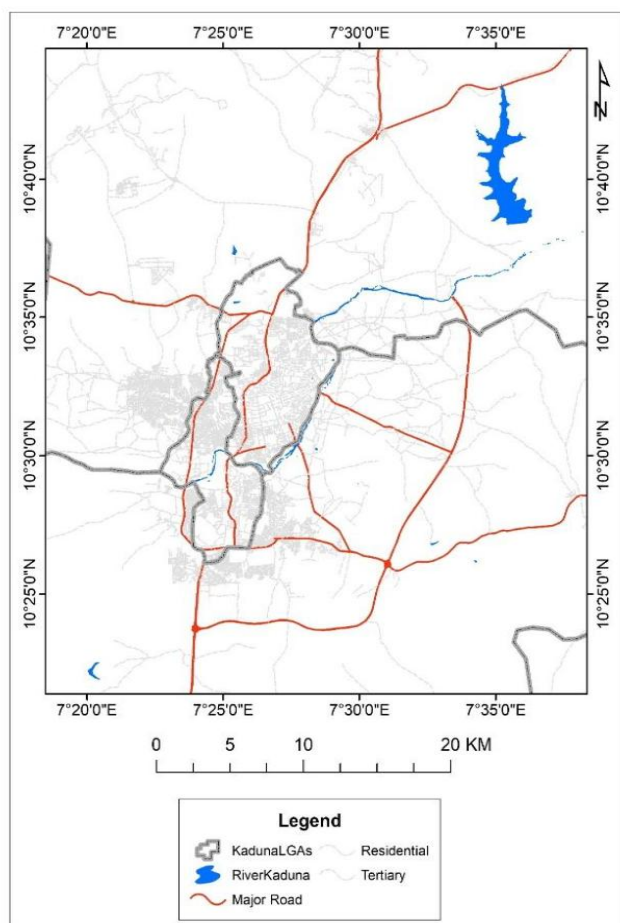


Figure 1: Map of the Kaduna Metropolis.

Source: Adopted from GRID 3 Nigeria, 2024

Administratively, the Kaduna metropolis is subdivided into local government areas (LGAs), such as Kaduna North, Kaduna South, Igabi, and Chikun, which collectively form the metropolitan area (Umar et al., 2025). It is one of the major urban centers in the northern part of Nigeria and is marked by high urbanization levels,

growth in population size, and an increase in commercial activities. In terms of the economy, the city of Kaduna can be regarded as a major commercial and business center for the region. This is supported by the rise of the hospitality sector, which is driven by the growth of tourism activities. The hospitality sector is marked by the presence of hotels and other related facilities for both local and foreign visitors (Mustapha et al., 2025). However, the degree of integration of green practices in the hospitality sector is still low; therefore, this case can be considered for the adoption of green tourism practices.

3.2 Research Design and Sampling Procedure

A descriptive survey design was used in this study to evaluate the awareness, adoption, benefits, and challenges of green practices in hospitality businesses in Kaduna Metropolis.

A multistage sampling technique was used in the study. Initially, the hotels in the metropolis were stratified according to their spatial arrangement and operational characteristics, for example, size, type, and service levels. Four hotels were subsequently selected from the stratified population of hotels in the metropolis using a purposive sampling technique based on the following criteria:

- Hotel size and staff population,
- Hotel accessibility and willingness to participate in the study,
- Existence of structured management systems, and
- Hotel relevance in terms of active involvement in hospitality service delivery.

Although the use of a purposive sampling method can be argued to be biased for the study, it can be justified in the context of a study on sustainable development, where access to information on operations and management is a key factor (Etikan et al., 2016). With the relatively small population size of 122 staff members from the chosen hotels, the study utilized a census sampling method, in which all the staff directly involved in the operations and decision-making processes were included. This method is useful for avoiding sampling errors from the chosen units. The distribution of staff across selected hotels is given in Table 1.

Table 1: Sample size of the study

S/n	Centres	Position	Staff Population
1	Bafra Hotel	Kaduna North	35
2	Epitome Hotel	Kaduna South	37
3	Brangel Hotel & Resort	Chikun	30
4	Fifth Chucker Resort & Accommodation	Igabi	20
	Total		122

3.3 Data collection instrument and validation

The data were collected through the administration of a

structured questionnaire that was specifically designed to elicit data on the following aspects:

- Awareness and implementation of green practices
- Benefits of sustainable practices
- Challenges in implementing sustainable practices

A Likert scale was used to measure the data, with the scale ranging from 1, which corresponds to “strongly disagree,” to 5, which corresponds to “strongly agree,” as seen in the computation of the mean.

To validate the research instrument, the questionnaire was tested by subjecting it to expert judgment by hospitality management and environmental sustainability experts.

Cronbach’s alpha coefficient was also computed to validate the reliability of the research instrument, as the computed value was well above the threshold of 0.70, indicating that the instrument was reliable (Hair et al., 2019).

3.4 Data Analysis

Data analysis was performed using the Statistical Package for the Social Sciences (SPSS) software version 28. Descriptive statistical tools such as the mean and standard deviation were used to assess the level of awareness and implementation of green practices (Objective 1).

To achieve Objective 2, exploratory factor analysis was performed to determine the underlying factors of perceived benefits and challenges. The following procedures were followed:

- Principal component analysis was used as a method of extraction.
- Varimax rotation was performed to simplify the factors.
- Kaiser–Meyer–Olkin was used as a measure of sampling adequacy,
- Bartlett’s test of sphericity was performed to ensure the applicability of exploratory factor analysis.

Factors were extracted if they had eigenvalues greater than one. Variables were considered only if they were significant. This method ensures the robust identification of the factors of sustainability perceptions (Hair et al., 2019).

3.5 Ethical Consideration

Ethical considerations were observed as follows: the research was conducted in compliance with the ethical standards of social science research, and the respondents were only involved voluntarily, with the guarantee of confidentiality and anonymity of information. The respondents were also given the right to consent before the research was conducted, as well as the right to

withdraw at any stage of the research. Moreover, the research did not address sensitive personal information, as the information collected was purely for academic purposes.

4 Results and Discussion

This section critically examines the awareness, implementation, benefits, and challenges of green practices in tourism in Kaduna Metropolis, using empirical data to contextualize findings within the Triple Bottom Line (TBL) framework (Elkington, 1994) and the literature on sustainable hospitality management. A total of 122 questionnaires were administered, of which 106 were completed and returned, yielding a response rate of 86.9%, which was considered highly satisfactory for robust analysis.

4.1 Awareness and Implementation of Green Practices

The mean and standard deviation values for the adoption of certain green practices by the selected hospitality businesses are provided in Table 2. From the analysis, it can be concluded that energy-saving lighting (mean = 4.08) is the most adopted practice, followed by water-saving practices (mean = 4.02) and waste reduction/recycling programs (mean = 3.93). A moderate level of adoption was observed for the use of eco-friendly cleaning products (mean = 3.82) and local/organic products (mean = 3.90). The lowest level of adoption was observed for renewable energy utilization (mean = 3.63).

These results suggest that cost-effective and easy-to-implement green practices are given priority in the hospitality industry, which aligns with the results of González-Rodríguez et al. (2020) and Meduna et al. (2024), who highlighted the adoption of green practices in the hospitality industry, considering the cost-effectiveness of the practices in terms of financial benefits as well as environmental benefits. In addition, the results suggest that renewable energy utilization, which records the least adoption, can be improved with the support of the government in terms of financial subsidies and technical training, as highlighted in the study conducted by Mensah (2020) in a developing country context.

From a TBL perspective, these results suggest that hotels are integrating the environment (“planet”) with profit, as in cost savings, while the social components (“people”) are less consistent, suggesting a less complete integration of the TBL.

Table 2: Means and Standard Deviations of Green Practices Implementation

Green Practices	SD	D	N	A	SA	Total	Mean	Std. Deviation
Energy-efficient lighting (LED bulbs)	13	9	5	9	70	106	4.0755	1.47162
Water conservation measures (low-flow faucets, rainwater harvesting)	6	4	23	22	51	106	4.0189	1.1709
Waste reduction and recycling programs	4	14	21	13	54	106	3.9340	1.2593
Use of eco-friendly cleaning products	6	9	23	28	40	106	3.8208	1.1936
Sourcing of local and organic products	11	6	16	23	50	106	3.8962	1.3375
Environmental awareness training for staff	6	13	19	14	54	106	3.9151	1.3028
Renewable energy use (solar, wind)	8	22	15	17	44	106	3.6321	1.3960

4.2 Perceived benefits and challenges

The results of the factor analysis (Table 3) revealed eight types of perceived benefits, with increased patronage (KMO = 0.781), customer satisfaction (KMO = 0.764), and reduced operation costs (KMO = 0.742) being the most prominent.

The research findings validate the notion that sustainable development in hospitality businesses is beneficial for both environmental and economic development, as proposed by the TBL approach. From the research findings, increased patronage and customer satisfaction imply that the implementation of eco-friendly strategies increases stakeholders' loyalty and trust, a notion supported by González-Rodríguez et al. (2020)

and Babagbale et al. (2019). In contrast, the lower KMO for the finding that no benefits were observed (0.637) implies that some stakeholders may still doubt the benefits of sustainable development in hospitality businesses; this notion is supported by Okeke and Nwosu (2021).

Critically, the results show that TBL-oriented adoption is not uniform, while profit- and planet-oriented outcomes are recognized, the social dimension, particularly staff engagement and community inclusion, is less systematically reported. This highlights an opportunity for hotels to adopt more holistic sustainability strategies that explicitly link human welfare, environmental stewardship, and financial performance.

Table 3: Benefits Observed from Green Practices

Benefits Category	KMO (Sampling Accuracy)	Bartlett's Test Sig. (p < 0.05)
Increased patronage	0.781	0.000
Improved customer satisfaction	0.764	0.000
Reduced operational costs	0.742	0.000
Enhanced business reputation	0.728	0.001
Environmental conservation	0.711	0.002
Improved customer satisfaction + Enhanced reputation	0.693	0.003
Environmental conservation + Increased patronage	0.662	0.004
No benefits observed	0.637	0.205

4.3 Challenges in implementing green practices

As depicted in Table 4, which presents the analysis of the barriers, high initial costs emerge as the main challenge (KMO = 0.774). This is followed by inadequate infrastructure (KMO = 0.732), customer awareness (KMO = 0.719), and staff expertise (KMO = 0.703). Inadequate enforcement of environmental regulations (KMO = 0.681) also emerges as a barrier.

These barriers are in agreement with the trends in developing economies, where a lack of resources, training, and appropriate regulations is considered a barrier to the comprehensive implementation of green initiatives (Budeanu et al., 2021; Becken & Hughey, 2020). As depicted from the TBL perspective, these barriers

reveal that businesses are forced to choose between profit and sustainability in the long term, as the ability of hotels to achieve a balance between these three aspects is affected by these barriers.

Table 4: Challenges in Implementing Green Practices

Challenge Category	KMO (Sampling Accuracy)	Bartlett's Test Sig. ($p < 0.05$)
High initial costs	0.774	0.000
High initial costs + Poor enforcement	0.751	0.000
Inadequate infrastructure	0.732	0.001
Low customer awareness	0.719	0.002
Lack of awareness or expertise	0.703	0.003
Poor enforcement of regulations	0.681	0.004

4.4 Synthesis and Critical Insights

Overall, the results indicate that hospitality firms in Kaduna Metropolis have made substantial advancements in sustainable practices, particularly in operationally efficient and cost-driven approaches. However, the extent of adoption is considered moderate, and the inclusion of the social dimension of TBL is not explicitly observed.

This suggests that although financial and environmental gains are the motivational factors for the decision-making process, the need for staff capacity building, customer education, and community participation should be stressed for the sustainability of the hospitality industry. Furthermore, financial and legal barriers highlight the need to develop facilitatory mechanisms for the adoption of capital-intensive sustainable practices, such as the use of renewable energy systems.

The research results are consistent with the empirical evidence of sustainable practices in the Nigerian hospitality industry (Idoko et al., 2025; Meduna et al., 2024) and the international hospitality industry (Camilleri & Daitai, 2023; Monzon Po, 2022), which confirms the applicability of the TBL as a sustainability tool for the hospitality industry on a global scale. By linking managerial practices, stakeholder perceptions, and environmental responsibility, this study contributes to the literature by contextualizing green practice adoption within a developing urban African setting, offering practical insights for policymakers, industry actors, and scholars.

5 Conclusion

The research reveals that hospitality businesses in Kaduna Metropolis have started adopting green practices, although at a moderate level. Low-cost and easy-to-implement strategies, such as using energy-saving lighting, conserving water, and reducing waste, are widely adopted, but expensive and technologically demanding strategies, such as using renewable sources of energy, are not adopted because of financial and technical barriers.

There are many benefits of adopting green practices, and they can be grouped into economic, social, and environmental benefits, as described in the Triple Bottom Line (TBL) model. The economic benefits are cost reduction and increased customer patronage, the social benefits are customer satisfaction and perception, and the environmental benefits are resource efficiency and conservation. Although there are barriers such as high investment costs, customer awareness, and employees' expertise, it is evident from this research that adopting sustainable business practices is profitable for businesses.

From a strategic point of view, this study highlights the need to understand the importance of sustainability within the hospitality industry by equally valuing the profit, people, and planet aspects of the TBL. The integration of financial sustainability and social as well as environmental responsibility is thus aligned with several of the Sustainable Development Goals (SDGs), such as SDG3 Good Health and Well-being, SDG11 Sustainable Cities and Communities, SDG12 Responsible Consumption and Production, and SDG13 Climate Change.

Based on the research findings, the following recommendations are proposed to improve green practices and sustainability within the hospitality industry of Kaduna Metropolis:

- i. To mitigate the capital constraint of high initial investments for hotels, governments and industry players need to introduce various financial incentives in the form of grants and low-interest loans to hotels that are installing energy-efficient systems, water-saving equipment, and renewable energy systems. This would ease the capital constraint for hotels to adopt environmentally sustainable infrastructure, especially for SMEs.
- ii. Hospitality industry players need to institutionalize training programs for their staff on environmental awareness and sustainability. This would improve their technical knowledge and participation in environmental sustainability initiatives and strengthen the social dimension of the TBL by instilling a sense of responsibility for their staff and the surrounding community.

- iii. There is a need to raise environmental awareness among their customers and encourage them to adopt environmentally friendly behaviors. This would strengthen the social and environmental aspects of TBL and reap economic rewards in terms of customer loyalty and positive brand associations.
- iv. The government should also formulate and implement standards for sustainable hospitality. This requires collaboration among stakeholders, including the government, industry associations, and hotels. This would ensure uniform performance in all aspects of sustainability across hotels.
- v. Hospitality managers should also ensure that they have a long-term approach to sustainability. This would ensure a balance between efficiency and social responsibility. This is in line with the TBL model and global SDGs, which ensure that sustainability is practiced for the betterment of tourism.

References

- Abubakar, M. L., Abdussalam, A. F., Mohammed, H. I., Ahmed, M. S., & Musa, A. S. (2025). Flood susceptibility assessment via GIS and the analytical hierarchy process in Kaduna, Nigeria. *Discover Geoscience*, 3(1), 94. <https://doi.org/10.1007/s44288-025-00204-8>
- Adewale, A., & Arowosafe, A. (2022). Guest's awareness of sustainable green practices in selected hotels in South West Nigeria. *Journal of Tourism and Hospitality Management*, 10(2), 45–62.
- Adeyemi, T., & Ojo, S. (2024). Corporate social responsibility and long-term sustainability in the Nigerian hospitality sector. *Journal of Hospitality Management and Tourism Research*, 18(2), 45–60.
- Babagbale, J., Oyadiran, O., & Joseph, E. (2019). Challenges impeding green practices in hotels in Nigeria. *African Journal of Hospitality and Tourism*, 8(1), 12–29.
- Becken, S., & Hughey, K. F. D. (2020). Linking tourism, climate change, and sustainable development: The role of governments and industry. *Journal of Sustainable Tourism*, 28(4), 525–542.
- Budeanu, A., Miller, G., Moscardo, G., & Ooi, C. S. (2021). Environmental management in tourism: Barriers and challenges in implementing sustainable practices. *Tourism Management Perspectives*, 37, 100780.
- Camilleri, M., & Daitai, M. (2023). Sustainable tourism development in South Africa: Awareness and implementation of sustainable practices. *Tourism Review*, 78(4), 512–530.
- Elkington, J. (1994). *Towards the Sustainable Corporation: Win-Win Business Strategies for Sustainable Development*. California Management Review, 36, 90–100. <http://dx.doi.org/10.2307/41165746>
- Elkhwesky, Z., Salem, I. E., Varmus, M., & Ramkissoon, H. (2022). Sustainable practices in hospitality pre and amid COVID-19 pandemic: Looking back for moving forward post-COVID-19. *Sustainable Development*, 30(5), 1426. <https://doi.org/10.1002/sd.2304>
- Elsa, K. (2023). Indigenous knowledge and sustainable tourism: Contributions to sustainability in Sweden and Canada. *Journal of Ecotourism Studies*, 22(3), 215–234.
- Emad, M., & Omar, H. (2023). Sustainability of green tourism and its impact on environmental achievement: Evidence from Petra Heritage, Jordan. *Journal of Sustainable Tourism*, 31(5), 1045–1067.
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics*, 5, 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- González-Rodríguez, M. R., Martín-Ruiz, D., & Díaz-Fernández, M. C. (2020). Eco-friendly practices and customer loyalty in tourism businesses: Evidence from Spain. *International Journal of Hospitality Management*, 88, 102518.
- Hair, J. F., Babin, B. J., Anderson, R. E., & Black, W. C. (2019). *Multivariate Data Analysis* (8th ed.). England: Pearson Prentice.
- Idoko, C. O., Ogunkolu, F. A., & Idakwoji, S. P. (2025). Environmental sustainability practices and operational efficiency of hotels in Kogi State, Nigeria. *International Journal of Sustainable Tourism Management*, 8(1), 33–47.
- Kadek, I. (2019). Sustainable tourism practices as a strategy to enhance corporate brand in Bali and Jakarta, Indonesia. *International Journal of Tourism Management*, 30(6), 1025–1043.
- Lukose, A., & Agbeyangi, D. (2024). ICT literacy, awareness, and adoption of sustainable tourism practices in Mquma Municipality, Eastern Cape Province, South Africa. *Journal of Sustainable Hospitality*, 16(1), 88–104.
- Meduna, L. A., Adewuyi, T., & Olorunfemi, F. (2024). Sustainable management practices and customer behaviour in selected hotels in Kwara State. *Journal of Tourism, Leisure and Hospitality Research*, 12(3), 78–92.
- Mensah, I. (2020). Barriers to sustainable tourism adoption in developing countries: Financial and infrastructural challenges. *Tourism Review International*, 24(3), 231–247.
- Monzon Po, M. (2022). Adoption of sustainability practices in small and medium-sized tourist accommodations in the Philippines. *Asia Pacific Journal of Tourism Research*, 27(11), 1163–1180.

- Muhammad, R. Z., & Abubakar, M. L. (2025). Assessing the influence of land surface temperature and sociodemographic factors on measles prevalence using AutoML and SHAP in Kaduna North, Nigeria. *GeoJournal*, 90(3), 103. <https://doi.org/10.1007/s10708-025-11361-1>
- Mustapha, B. B., El-Rufai, U. M., Mohammed, H. I., & Abdullahi, H. (2025). Tourist Perceptions of Environmental and Infrastructural Barriers to Urban Leisure in Kaduna Metropolis Hotels. *Kaduna Journal of Geography*, 7(1), 307-318. <https://doi.org/10.47514/kjg.2025.07.01.034>
- Ndalnamu, D. A., Shinggu, I. T., & Terwase, F. T. (2024). Assessment of sustainable practices among hospitality businesses in Adamawa State. *African Journal of Hospitality and Tourism Management*, 9(2), 55–70.
- Ojonuba, S. A., Ahmed, M. S., & Abubakar, M. L. (2025). Assessment of public Awareness, Knowledge, attitude and perception on microplastics pollution in Kaduna Metropolis, Kaduna. *Ghana Journal of Geography*, 17(1), 7-14. <https://doi.org/10.4314/gjg.v17i1.2>
- Okeke, T., & Nwosu, P. (2021). Perceptions and skepticism towards sustainable tourism in Nigeria: Awareness and profitability perspectives. *African Journal of Hospitality, Tourism and Leisure*, 10(2), 59–75.
- Oriade, O. (2021). Sustainability awareness, management practices, and employee ecological behavior in UK hotels. *Journal of Hospitality and Tourism Insights*, 4(2), 105–123. <https://doi.org/10.1016/j.ijhm.2020.102699>
- Serio, R. G., Giuliani, D., Dickson, M. M., & Espa, G. (2025). Going green across boundaries: Spatial effects of environmental policies on tourism flows. *ArXiv*. <https://arxiv.org/abs/2504.03608>
- Streimikiene, D., Balezentis, T., & Balezentis, A. (2020). Environmental, social, and economic pillars of sustainability in tourism. *Sustainability*, 12(7), 2765.
- Umar, A., Mukhtar, A. A., Abubakar, M. L., & Abdussalam, A. F. (2025). Assessing Sustainable Environmental Practices and Carbon Footprint Awareness Among Urban Dwellers in Kaduna Metropolis. *Science World Journal*, 20(2), 639-646. <https://doi.org/10.4314/swj.v20i2.27>
- United Nations World Tourism Organization. (2020). Impact of COVID-19 on global tourism: Statistical overview. UNWTO Publications.
- United Nations. (2015). Transforming our world: The 2030 agenda for sustainable development. United Nations Publishing.
- Varga, L. (2010). Environmental challenges in global tourism and hospitality development. *Tourism Review International*, 14(2–3), 101–115.
- World Travel & Tourism Council. (2021). Economic impact report: Global trends in travel and tourism. WTTC.
- Zam, A. B. (2023). Environmental opportunities and sustainable development challenges in Kaduna Metropolis. *Journal of Environmental Sustainability Research*, 5(2), 101–115.