

RESEARCH ARTICLE

Sustainable Tourism Management in the Era of Overtourism: A Systematic Review of Strategies and Best Practices

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ABSTRACT

The rapid expansion of global tourism has led to significant challenges, particularly overtourism and seasonality, which threaten environmental sustainability, local communities, and visitor experiences. Managing these challenges requires innovative strategies, including visitor flow management, eco-tourism initiatives, technological interventions, and regulatory frameworks. Smart technologies, such as artificial intelligence (AI), big data analytics, and digital monitoring systems, are emerging as crucial tools in mitigating the adverse effects of overtourism by optimizing visitor distribution and promoting sustainable tourism practices.

Aim– This systematic review aimed to explore sustainable tourism management strategies, with a particular focus on mitigating overtourism and seasonality through innovative approaches. **Method**– A comprehensive narrative review was conducted by analyzing peer-reviewed literature, policy reports, and case studies retrieved from academic databases such as Scopus, Google Scholar, ResearchGate, and Emerald Insight. The review examined various sustainable tourism management strategies and their effectiveness in different tourism contexts. **Result**– The findings indicate that destinations implementing visitor flow control measures, smart tourism technologies, and regulatory mechanisms have experienced improved tourism sustainability. AI-driven crowd monitoring, digital visitor management platforms, and community-based tourism models contribute significantly to reducing environmental and social pressures on overburdened destinations. However, gaps remain in assessing the long-term impact of these strategies. **Conclusion**– This study highlights the critical need for evidence-based, adaptive strategies in sustainable tourism management. By integrating AI-driven automation, eco-tourism frameworks, and regulatory controls, destinations can mitigate overtourism and promote responsible tourism development. Future research should focus on longitudinal studies to assess the lasting impact of these strategies and refine best practices for global tourism sustainability.

Keywords: Sustainable tourism, Overtourism mitigation, Smart tourism technologies, AI in tourism management, Visitor flow management, Eco-tourism strategies, Digital transformation

INTRODUCTION

Background

Tourism has become one of the fastest-growing industries globally, contributing significantly to economic development, employment, and cultural exchange (UNWTO, 2023). According to the United Nations World Tourism Organization (UNWTO), international tourist arrivals reached 1.4 billion in 2019, a sharp increase from 674 million in 2000 (UNWTO, 2023). While tourism has generated substantial

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revenue for local economies, it has also led to critical sustainability challenges, particularly in popular destinations experiencing high tourist influxes.

One of the most pressing challenges in contemporary tourism is overtourism, a term that describes the excessive concentration of tourists in certain destinations, resulting in environmental degradation, cultural dilution, and negative social impacts (Seraphin *et al.*, 2018). Cities such as Venice, Barcelona, and Dubrovnik have struggled with the consequences of overtourism, including increased pollution, rising housing costs due to short-term rentals, and conflicts between residents and tourists (Milano *et al.*, 2019). In natural destinations such as the Galápagos Islands and Machu Picchu, fragile ecosystems are at risk due to unchecked visitor numbers (Epler Wood, 2017).

Furthermore, seasonality in tourism exacerbates the problem by creating economic instability and infrastructure overload during peak seasons while leaving businesses and workers vulnerable during off-seasons (Baum & Lundtorp, 2001). Seasonality-driven fluctuations impact employment, strain local resources, and lead to inefficient infrastructure utilization (Butler, 2018). As a result, sustainable tourism management strategies are critical to ensuring long-term economic and environmental viability.

Problem Statement

The negative consequences of overtourism and seasonality have sparked concerns among policymakers, local communities, and tourism businesses. While various mitigation strategies have been proposed—such as visitor caps, tourism dispersal, and digital solutions—there is a lack of comprehensive research evaluating their effectiveness across different contexts (Gössling *et al.*, 2021). Many destinations implement reactive policies, such as tourist taxes or crowd control measures, without long-term planning for sustainability (Peeters *et al.*, 2018). Moreover, the growing influence of digital

platforms such as Airbnb and Instagram-driven tourism has intensified the problem by promoting specific hotspots, leading to further congestion (Dodds & Butler, 2019).

Additionally, existing research tends to focus on individual case studies, making it difficult to generalize best practices applicable to diverse destinations (Cheer *et al.*, 2021). There is a critical need for a systematic review of sustainable tourism strategies to assess their effectiveness, identify research gaps, and provide evidence-based recommendations for tourism stakeholders.

Objectives

This study aims to systematically review existing literature on sustainable tourism management, with a particular focus on strategies addressing overtourism and seasonality. The key objectives of this research are:

1. To analyze the causes and impacts of overtourism and seasonality on destinations.
2. To categorize and evaluate the effectiveness of different mitigation strategies, including visitor flow management, eco-tourism initiatives, smart tourism technologies, and regulatory frameworks.
3. To identify research gaps and suggest future directions for sustainable tourism development.
4. To provide actionable insights for policymakers, tourism managers, and researchers.

LITERATURE REVIEW

Overtourism refers to the phenomenon wherein an excessive number of tourists visit a destination, resulting in detrimental environmental, socio-cultural, and economic impacts (Goodwin, 2017). The term gained prominence in scholarly discourse and policymaking as cities such as Barcelona, Venice, and Amsterdam began experiencing the adverse effects of mass tourism (Seraphin *et al.*, 2018). These include environmental degradation, congestion, increased living

costs for residents, and the commodification of local cultures (Milano, 2018). Butler (2019) argues that overtourism is not merely a function of visitor numbers but also of poor governance, inadequate infrastructure, and ineffective tourism management strategies. Various scholars have proposed solutions such as visitor caps, taxation policies, and spatial redistribution strategies to mitigate the negative effects (Koens, Postma, & Papp, 2018).

Sustainable Tourism is defined as tourism that meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future (UNWTO, 2021). It seeks to balance environmental conservation, socio-cultural preservation, and economic benefits (Bramwell & Lane, 2011). Sustainability in tourism is often linked to the principles of responsible travel, which emphasize minimizing environmental footprints, supporting local economies, and respecting cultural heritage (Sharpley, 2020). Hall (2019) highlights three pillars of sustainable tourism: environmental sustainability (e.g., reducing carbon emissions and waste management), socio-cultural sustainability (e.g., ensuring community participation and cultural preservation), and economic sustainability (e.g., equitable distribution of tourism revenues). Destinations such as Costa Rica and Bhutan have been lauded for implementing successful sustainable tourism policies through eco-certifications, carrying capacity assessments, and community-based tourism models (Weaver, 2016).

Seasonality in Tourism refers to the temporal variations in visitor numbers and tourism activities due to climatic conditions, holiday periods, and cultural events (Butler, 2001). It presents significant challenges for destination management, including fluctuating demand, employment instability, and pressure on infrastructure (Baum & Lundtorp, 2001). High season peaks may lead to overcrowding and strain on resources, while low seasons result in revenue shortfalls and underutilized facilities (Jang,

2004). Strategies to address seasonality include product diversification (e.g., promoting off-season attractions), pricing incentives (e.g., discounts during low-demand periods), and event-based tourism (e.g., festivals to attract visitors year-round) (Koenig-Lewis & Bischoff, 2010). Empirical studies indicate that destinations implementing adaptive strategies—such as year-round cultural tourism in European cities or ski resorts repurposing facilities for summer tourism—have successfully mitigated the adverse effects of seasonality (Higham & Hall, 2005).

MAJOR STUDIES ON OVERTOURISM

Case Studies of Destinations Facing Overtourism

Overtourism has become a pressing global issue, impacting the economic, social, and environmental sustainability of numerous destinations. Various cities and tourist hotspots have implemented a range of policy responses to mitigate its negative consequences. The following case studies examine the strategies adopted by three destinations—Venice, Barcelona, and Maya Bay—and analyze their effectiveness in addressing overtourism.

Venice, Italy: Managing Tourist Influx through Regulation

Venice, one of the most visited cities in the world, has long struggled with the adverse effects of overtourism, including environmental degradation, the displacement of local residents, and infrastructural strain. To counteract the overwhelming influx of tourists, the city introduced a multi-faceted regulatory approach. A daily entrance fee was introduced for day-trippers to help fund maintenance and conservation efforts (Seraphin *et al.*, 2018). Large cruise ships were restricted from entering the historic city center to reduce environmental and infrastructural damage (UNESCO, 2021). The government implemented controlled entry times to popular attractions such as St. Mark's Basilica and the Rialto

Bridge, aiming to disperse tourist traffic more evenly throughout the day (Dodds & Butler, 2019). While these measures have shown some success in reducing congestion and generating revenue for preservation efforts, critics argue that they do not address the fundamental issue of tourism-dependent economic structures and the decline of local residential populations.

Barcelona, Spain: Policy Interventions to Combat Rising Housing Costs and Social Unrest

Barcelona has experienced significant social backlash due to overtourism, particularly concerning housing affordability and public space congestion. Residents have protested against the increasing presence of short-term rentals, which have contributed to rising rental prices and the displacement of local communities. The city has implemented several strategies to address these challenges. Strict policies were enacted to limit the number of Airbnb-style rentals, requiring licensing and imposing heavy fines for illegal listings (Koens *et al.*, 2018). Promotional campaigns encouraged visitors to explore lesser-known neighborhoods and visit during off-peak seasons to ease congestion in popular areas such as La Rambla and Park Güell (González & Moral, 2020). The city introduced eco-friendly tourism initiatives, including restrictions on tour buses in the Gothic Quarter and increased investments in cultural tourism experiences outside the city center (UNWTO, 2022). Although these measures have helped mitigate the impact of overtourism, tensions between residents and tourists persist, and concerns about the long-term sustainability of Barcelona's tourism economy remain a topic of debate.

Maya Bay, Thailand: Temporary Closure as a Conservation Strategy

Maya Bay, a globally recognized tourist destination made famous by the movie *The Beach* (2000), suffered severe environmental degradation due to mass

tourism, including coral reef destruction and ecosystem damage. In response, the Thai government implemented one of the most drastic conservation strategies. In 2018, the beach was closed indefinitely to allow the ecosystem to recover, with initial plans for a four-month closure extended to more than three years (Hampton & Jeyacheya, 2020). During the closure, marine biologists and conservationists undertook coral restoration projects and monitored the gradual revival of marine biodiversity (Dujardin *et al.*, 2021). When the beach reopened in 2022, new regulations were introduced, including a strict limit on daily visitor numbers, designated swimming areas, and a ban on boats anchoring near the shore (Thailand Department of National Parks, 2022). This case demonstrates the effectiveness of temporary closures as an extreme but necessary measure to restore ecological balance. However, questions remain about the long-term viability of tourism management strategies that rely on periodic shutdowns rather than systemic change.

SUSTAINABLE TOURISM MANAGEMENT STRATEGIES

Sustainable tourism management strategies have been developed to address the pressing challenges of overtourism while ensuring long-term benefits for both destinations and local communities. Scholars and policymakers have focused on a variety of approaches, including visitor dispersal mechanisms, technological innovations, and community-based tourism models. These strategies aim to mitigate congestion, promote equitable economic benefits, and safeguard the environmental and cultural integrity of tourism destinations.

Visitor dispersal strategies play a crucial role in alleviating congestion at major tourist destinations by encouraging travelers to visit alternative locations or travel during non-peak periods. One of the most effective methods involves timed entry systems, such

as those implemented at Machu Picchu, where a pre-booking and time-slot reservation system helps regulate visitor access to this UNESCO World Heritage site (Brouder, 2020). By managing entry times, authorities can prevent overcrowding while ensuring a steady flow of tourists throughout the day. Another widely adopted dispersal approach includes promoting alternative routes and attractions through targeted marketing campaigns. Japan, for example, has actively encouraged rural tourism as a way to divert visitors away from overcrowded cities like Tokyo and Kyoto, thereby spreading tourism benefits across lesser-known regions (Weaver, 2016). Additionally, dynamic pricing models have been introduced in various destinations to influence visitor behavior. Many European museums, for instance, have successfully managed tourist demand by increasing entrance fees during peak hours and offering discounts for off-peak visits. This pricing strategy not only controls visitor numbers but also incentivizes tourists to explore attractions at different times, reducing excessive crowding (Hall, 2019).

Technological advancements have significantly improved sustainable tourism management by enhancing crowd control and optimizing visitor experiences through data-driven decision-making. Cities such as Amsterdam and Venice have implemented AI-driven crowd monitoring systems, which utilize AI-powered surveillance networks and mobile data tracking to monitor real-time visitor flows. These technologies allow local authorities to implement proactive congestion control measures, such as redirecting visitors to less crowded areas or temporarily restricting access to overburdened sites (Gössling, 2021). Another innovative solution is the introduction of virtual tourism experiences, which incorporate augmented reality (AR) and virtual reality (VR) technologies. These immersive digital tourism alternatives provide visitors with a realistic experience of historical landmarks and natural wonders without

physically impacting fragile ecosystems (Tussyadiah *et al.*, 2020). Virtual tourism has proven particularly useful in destinations where high foot traffic poses environmental risks, such as coral reefs and ancient heritage sites. In addition, smart destination management platforms have been developed to offer real-time recommendations to tourists based on congestion levels. These digital tools provide alternative attraction suggestions, transportation updates, and personalized itineraries, ultimately contributing to a more balanced distribution of visitors across urban centers (Hall, 2019).

Community-based tourism (CBT) has emerged as a powerful approach to sustainable tourism management by prioritizing local engagement, ensuring equitable economic benefits, and preserving cultural heritage. Countries such as Bhutan have successfully implemented a high-value, low-impact tourism model, which enforces a mandatory daily tourism fee. This policy not only controls visitor numbers but also ensures that tourism revenue directly benefits local communities, funding infrastructure development, cultural preservation, and environmental conservation initiatives (Nepal & Nepal, 2019). Similarly, Kenya's Maasai Mara region has adopted community-managed eco-tourism initiatives, where indigenous groups are actively involved in tourism-related decision-making. These initiatives empower local populations by generating income through conservation-based tourism activities, such as guided wildlife tours and sustainable lodging options (Goodwin, 2017). In Europe, rural tourism programs in Spain and Portugal have been supported by government-backed initiatives promoting agrotourism and heritage tourism in underpopulated rural areas. By encouraging visitors to explore these less-visited regions, these initiatives not only help alleviate pressure on urban tourism hubs but also contribute to regional economic development and the revitalization of traditional cultural practices (Sharpley, 2020).

RESEARCH METHODOLOGY

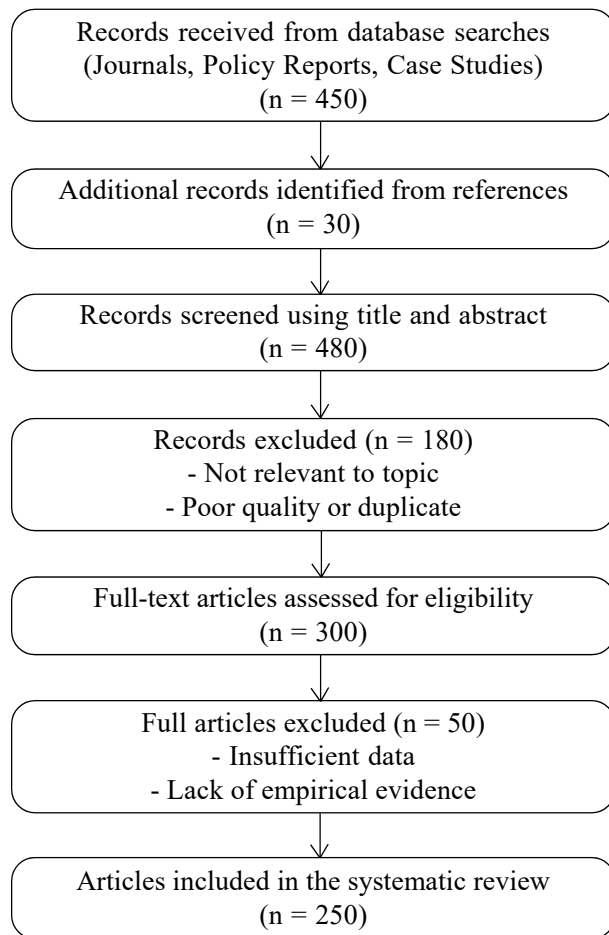


Figure 1: Flow diagram of screening and selection of reviews

FINDINGS AND RESULTS

The findings of this study highlight key strategies employed by various destinations to manage overtourism, promote sustainable tourism, and address seasonality challenges. The results focus on key areas, including visitor flow management, eco-tourism initiatives, technological interventions, and regulatory frameworks.

Effective visitor flow management strategies help reduce overcrowding in high-traffic destinations while enhancing visitor experiences and protecting local

communities. Many destinations have implemented timed entry systems and visitor quotas to regulate tourist numbers at popular sites. Amsterdam, for example, has introduced pre-booking systems for major attractions such as the Anne Frank House and Rijksmuseum, ensuring controlled entry and preventing congestion. Similarly, Machu Picchu enforces timed ticketing and daily visitor caps to minimize environmental degradation (Brouder, 2020). Another widely adopted strategy is the promotion of alternative destinations to distribute visitor numbers more evenly. Iceland's tourism board has encouraged travelers to explore lesser-known regions beyond Reykjavik and the Golden Circle, such as the East Fjords and the Westfjords. This approach has successfully helped balance tourist flows while supporting local economies in rural areas (Weaver, 2016).

Sustainable tourism practices emphasize environmental conservation and community participation, ensuring long-term benefits for both residents and travelers. Community-based tourism (CBT) models empower local populations by involving them in decision-making and revenue generation. Examples from Thailand and Costa Rica illustrate the effectiveness of these initiatives. In Thailand, rural villages offer homestays and guided eco-tours, directly benefiting local communities while providing immersive cultural experiences for visitors (Goodwin, 2017). Similarly, Costa Rica's eco-lodges and sustainable nature reserves promote low-impact tourism, ensuring environmental preservation and equitable economic distribution (Scheyvens, 2002). The development of eco-friendly accommodations and green certifications has also emerged as an essential sustainability measure. Many destinations require hotels to adopt sustainable practices, such as solar energy use, water recycling, and waste reduction. Costa Rica's Certification for Sustainable Tourism (CST), for example, rewards hotels that meet strict

environmental and social criteria, setting a benchmark for responsible tourism (Hall, 2019). Technological advancements play a significant role in managing overtourism by optimizing visitor experiences and ensuring efficient crowd control. Cities such as Barcelona use AI-powered crowd monitoring systems to manage visitor flows in real time. These smart tourism systems analyze mobile data, social media activity, and sensor networks to identify overcrowded areas, allowing local authorities to implement congestion control measures (Gössling, 2021). This technology helps guide tourists to less crowded attractions, reducing pressure on high-traffic sites. Additionally, mobile applications and digital tools provide real-time visitor information, alternative travel routes, and congestion updates. Japan's Smart Tourism Initiative, for example, includes an app that suggests less crowded attractions based on user location, weather conditions, and live visitor density (Tussyadiah *et al.*, 2020). These innovations not only enhance visitor experiences but also promote more sustainable travel behavior.

Governments have introduced regulatory mechanisms to mitigate the adverse effects of overtourism and ensure balanced tourism development. One common approach has been the introduction of tourist taxation to control visitor numbers and generate revenue for infrastructure improvements. Venice, for instance, has implemented a day-visitor fee for tourists entering the historic city center, aimed at reducing overcrowding while funding preservation efforts (Seraphin *et al.*, 2018). Similarly, Bali's newly introduced environmental tax supports conservation projects and community-based initiatives. In addition to taxation, zoning laws and short-term rental regulations have been implemented in many urban destinations to control the rapid expansion of tourism accommodation. Paris has imposed restrictions on Airbnb-style rentals in certain districts to protect local housing affordability and prevent excessive tourism commercialization (Koens

et al., 2018). Similar measures have been enacted in New York City and Berlin, requiring short-term rental platforms to comply with licensing rules and rental limits. These regulatory measures help manage tourism growth while ensuring that local communities are not displaced or negatively impacted by an influx of visitors.

DISCUSSION

Sustainable tourism management is undergoing significant transformation due to emerging trends, particularly the integration of smart tourism technologies and the growing emphasis on localized, community-driven tourism experiences. These trends reflect a shift in how destinations address overtourism, aiming for more balanced visitor distribution and equitable economic benefits. However, despite these advancements, there remain notable gaps in research, particularly regarding the long-term effectiveness of mitigation strategies and the impact of seasonality-driven policies.

Trends in Sustainable Tourism Management

The rapid adoption of smart tourism technologies is reshaping the way destinations manage visitor flows and promote sustainability. Destination management organizations (DMOs) increasingly rely on artificial intelligence (AI), big data analytics, and the Internet of Things (IoT) to monitor real-time tourist movements, predict peak congestion times, and distribute visitors across multiple sites. Smart destination management platforms leverage this data to encourage tourists to explore lesser-known attractions, effectively reducing overcrowding at popular landmarks while enhancing the overall visitor experience. Additionally, AI-powered chatbots and mobile applications provide personalized recommendations based on user preferences and current congestion levels. These digital tools minimize the need for printed materials, thereby reducing environmental waste while improving the efficiency

of tourism management. Such innovations not only streamline operations but also contribute to responsible tourism by encouraging sustainable visitor behaviors.

Another prominent trend in sustainable tourism is the shift toward localized and community-driven tourism experiences as an alternative to mass tourism. Destinations worldwide are increasingly promoting authentic cultural interactions, such as homestays, locally guided tours, and indigenous-led experiences, which foster deeper engagement between visitors and host communities. These initiatives empower local populations by ensuring that tourism revenue remains within the community, supporting local businesses and preserving cultural heritage. Countries such as Thailand, Bhutan, and Costa Rica have successfully implemented community-based tourism (CBT) models, where tourism-generated income is reinvested into local development projects. This approach ensures a more sustainable and equitable distribution of benefits while reducing the negative impacts of mass tourism on fragile ecosystems and cultural sites. The success of these models highlights the importance of policies that encourage community participation in tourism planning and decision-making, ultimately leading to more sustainable tourism economies.

Gaps in Research

Despite the progress made in sustainable tourism management, several gaps in research remain, particularly concerning the long-term effectiveness of various mitigation strategies. While numerous destinations have introduced visitor caps, dynamic pricing models, and smart tourism interventions, there is a lack of longitudinal studies assessing their impact over extended periods. Many of these strategies have been implemented only in recent years, making it difficult to determine their long-term socio-economic and environmental consequences. Future research should focus on multi-year studies that track visitor behaviors, economic shifts, and environmental

changes to provide evidence-based recommendations for policymakers and tourism stakeholders. Such research would be instrumental in refining existing strategies and developing new, more effective approaches to managing tourism sustainably.

Additionally, there is limited research on the effectiveness of seasonality-driven policies. While the challenges posed by seasonality in tourism are well documented, empirical studies evaluating the success of mitigation strategies remain scarce. Policies such as off-season pricing incentives, diversification of tourism offerings, and event-based tourism initiatives have been proposed to address the fluctuations in visitor demand, yet their actual impact on traveler decision-making and overall tourism sustainability is not well understood. More research is needed to determine whether these policies effectively balance tourism demand throughout the year without causing unintended economic disruptions. Future studies should also explore how destinations can integrate seasonality management into broader sustainable tourism frameworks to ensure that economic benefits are distributed more evenly while minimizing the strain on local communities and resources.

CHALLENGES IN IMPLEMENTING STRATEGIES

While sustainable tourism management offers long-term benefits for both destinations and local communities, several challenges hinder the effective implementation of these strategies. The primary obstacles include resistance from businesses that rely on mass tourism and the financial constraints associated with developing sustainable tourism infrastructure. Addressing these challenges requires a combination of policy interventions, stakeholder collaboration, and innovative financing mechanisms.

One of the most significant barriers to implementing sustainable tourism strategies is the resistance from businesses that have traditionally

thrived on high visitor numbers. Hotels, tour operators, and local businesses that cater to mass tourism often prioritize short-term profitability over long-term sustainability. Policies such as visitor caps, taxation, and restrictions on short-term rentals, which are designed to reduce overcrowding and promote responsible tourism, are frequently met with opposition. Many businesses fear that these measures will lead to revenue losses and reduced customer inflow, particularly in destinations that rely heavily on tourism as a primary economic driver. Additionally, some local businesses may not fully understand the long-term advantages of sustainable tourism, such as improved destination reputation, enhanced visitor experiences, and more stable economic growth. To overcome this resistance, successful policy implementation must involve proactive stakeholder engagement, economic incentives, and educational initiatives. Governments and tourism boards should work closely with businesses to demonstrate the long-term benefits of sustainability, offering financial support, tax incentives, or marketing advantages to those who adopt eco-friendly and responsible tourism practices. Engaging industry leaders in decision-making and fostering a culture of sustainability can help shift mindsets and encourage widespread adoption of sustainable tourism strategies.

Another critical challenge is the funding constraints associated with developing sustainable tourism infrastructure. Implementing eco-friendly accommodations, efficient public transportation, advanced waste management systems, and digital infrastructure for smart tourism requires significant investment. This issue is particularly pressing in developing countries, where financial limitations and competing economic priorities often prevent governments from allocating sufficient resources to tourism sustainability projects. While some destinations have benefited from public-private partnerships and international funding programs,

financial constraints remain a major limiting factor. To bridge the funding gap, governments and tourism boards must explore innovative financing models such as green bonds, sustainability-linked tourism taxes, and investment incentives for eco-friendly tourism projects. Green bonds, for instance, can be used to finance large-scale sustainable infrastructure projects, while sustainability-linked taxes ensure that revenue generated from tourism directly contributes to conservation and community development efforts. Additionally, encouraging private sector investment in sustainable tourism through tax breaks, grants, or public-private partnerships can help distribute the financial burden more effectively.

FUTURE DIRECTIONS

The future of sustainable tourism management will be shaped by advancements in artificial intelligence (AI) and data analytics, along with efforts to expand sustainable tourism initiatives beyond high-profile destinations. These strategies will help optimize visitor flow, enhance tourism experiences, and promote regional tourism development, ensuring a more balanced and environmentally responsible tourism industry.

AI and data analytics are set to play a transformative role in managing visitor flow and preventing overcrowding in popular tourist destinations. Predictive analytics can enable destinations to anticipate visitor trends, allowing authorities to implement proactive measures such as adjusting ticket pricing, limiting access to high-traffic areas, or promoting alternative attractions during peak times. AI-powered decision support systems can analyze real-time data to distribute visitors more efficiently, thereby reducing congestion at key sites and improving overall visitor experiences. Additionally, AI-driven chatbots and virtual assistants can be integrated into tourism platforms to provide personalized recommendations, answer visitor queries, and assist with itinerary

planning. These digital tools not only improve customer service efficiency but also reduce the need for on-site staff and printed materials, contributing to a more sustainable tourism ecosystem. The integration of AI into tourism management can also facilitate smart city initiatives, where real-time monitoring and adaptive response mechanisms ensure that destinations remain accessible, enjoyable, and environmentally responsible.

Expanding sustainable tourism initiatives beyond well-known destinations is another critical future direction. Many popular tourist hotspots are struggling with the negative consequences of overtourism, including environmental degradation, social tensions, and infrastructure strain. To address this, future strategies should focus on promoting regional tourism development by encouraging visitors to explore lesser-known regions. Governments and tourism organizations must invest in strategic marketing campaigns that highlight the cultural, historical, and natural attractions of secondary and tertiary destinations. Additionally, developing infrastructure such as sustainable transportation networks, eco-friendly accommodations, and digital connectivity in these regions can enhance their appeal to tourists. Providing incentives for local entrepreneurs to establish tourism-related businesses, such as boutique hotels, guided experiences, and community-led initiatives, can further stimulate economic development while ensuring that tourism benefits are distributed more equitably.

By leveraging AI for smart tourism management and expanding sustainable tourism beyond traditional hotspots, the tourism industry can achieve a more balanced and responsible growth trajectory. These future-oriented strategies will not only help mitigate the adverse effects of mass tourism but also create new opportunities for communities and travelers alike, ensuring that tourism remains a sustainable and inclusive sector for years to come.

IMPLICATIONS FOR POLICY AND PRACTICE

The successful implementation of sustainable tourism strategies requires the active participation of governments, tourism businesses, and researchers. Policymakers must adopt dynamic pricing models and enforce capacity limits to regulate visitor numbers, thereby reducing the strain on popular destinations. Establishing clear sustainability regulations and incentivizing green tourism initiatives will help ensure that tourism remains a positive force for local communities and the environment. Additionally, governments should play a proactive role in supporting local communities by funding infrastructure improvements and providing incentives for businesses to adopt sustainable practices.

Tourism businesses also have a critical role in advancing sustainable tourism. Companies operating in this sector must invest in sustainable infrastructure, including energy-efficient accommodations, improved waste management systems, and eco-friendly transportation options. Integrating responsible tourism practices, such as promoting off-peak travel and utilizing digital tools for real-time visitor management, can help businesses mitigate their environmental impact while maintaining profitability. Moreover, by aligning their operations with sustainability standards, businesses can enhance their long-term resilience and reputation.

Researchers contribute to sustainable tourism by generating evidence-based insights that guide policy and practice. Future research should focus on exploring AI-driven visitor management solutions, predictive analytics for tourism demand forecasting, and data-driven approaches to optimizing tourism flows. Additionally, longitudinal studies assessing the effectiveness of existing policies can help refine and develop adaptable models that cater to diverse tourism destinations. Research that examines the socio-economic and environmental impacts of sustainable

tourism initiatives will be essential in shaping more effective long-term strategies.

RECOMMENDATIONS

A holistic approach to sustainable tourism management requires targeted interventions across multiple areas. First, enhancing collaboration among stakeholders is essential for effective tourism management. Coordinated efforts between policymakers, tourism businesses, local communities, and environmental organizations will facilitate data sharing, joint decision-making, and the successful implementation of sustainability initiatives. Multi-stakeholder partnerships can help align diverse interests while ensuring that tourism benefits are equitably distributed.

Promoting year-round tourism can alleviate the pressures of seasonality and prevent the overburdening of destinations during peak travel periods. Governments and businesses should focus on developing off-season attractions, cultural festivals, and alternative tourism experiences that draw visitors throughout the year. Investing in infrastructure that supports all-weather tourism activities, such as indoor cultural experiences and eco-tourism initiatives, can also help mitigate seasonal fluctuations in tourism revenue.

Leveraging technology for sustainable tourism management is another key strategy. Smart tourism technologies, including real-time visitor tracking, AI-driven demand forecasting, and mobile applications that guide tourists to less crowded areas, can significantly enhance tourism management. Digital tools not only improve the visitor experience but also help authorities monitor tourism flows, reduce congestion, and protect sensitive ecosystems.

Implementing sustainable certification programs and financial incentives for eco-friendly practices can drive responsible tourism behavior among businesses. Certification programs serve as benchmarks for best

practices and provide travelers with transparency regarding sustainable tourism options. Financial incentives, such as tax breaks or grants for businesses that adopt green initiatives, can further encourage compliance with sustainability standards.

Finally, supporting local communities should remain at the heart of sustainable tourism efforts. Governments and businesses must ensure that tourism revenue is reinvested into local economies, providing employment opportunities, improving infrastructure, and preserving cultural heritage. Community-led tourism models, in which local residents are actively involved in decision-making and benefit directly from tourism activities, can foster long-term sustainability and enhance visitor experiences. By prioritizing the well-being of host communities, tourism can become a more equitable and responsible industry that benefits both travelers and local populations alike.

CONCLUSION

This review underscores the pressing challenges associated with overtourism and seasonality, highlighting their impact on destination sustainability, local communities, and environmental integrity. As popular tourist destinations face increasing pressures due to excessive visitor numbers, there is an urgent need for innovative approaches to ensure long-term sustainability. Effective management strategies have emerged in response to these challenges, including visitor flow control mechanisms, eco-tourism initiatives, technological advancements, and regulatory interventions. These strategies aim to balance economic benefits with environmental and socio-cultural sustainability, ensuring that tourism remains a viable industry for future generations.

While these measures show promise, significant gaps remain in assessing their long-term effectiveness. Many interventions, such as smart tourism technologies, community-based tourism models, and dynamic pricing systems, require further empirical

evaluation to determine their sustainability over time. Additionally, a key challenge lies in striking the right balance between economic interests and sustainability goals. Destinations heavily reliant on tourism revenue often struggle to implement strict regulatory measures without disrupting their economic stability. Future research should, therefore, focus on developing adaptive, data-driven strategies tailored to diverse tourism contexts. By leveraging real-time data, predictive analytics, and stakeholder collaboration, tourism management can become more responsive and proactive in addressing sustainability challenges.

Ensuring the long-term viability of tourism requires a comprehensive and integrated approach that prioritizes environmental conservation, equitable economic distribution, and community well-being. By adopting sustainable policies and fostering innovation in tourism management, destinations can achieve a balance that benefits both visitors and host communities, securing a more responsible and resilient future for the global tourism industry.

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REFERENCES

- Baum, T., & Lundtorp, S. (2001). *Seasonality in tourism*. Pergamon.
- Bramwell, B., & Lane, B. (2011). Critical research on the governance of tourism and sustainability. *Journal of Sustainable Tourism*, 19(4–5), 411–421.
- Brouder, P. (2020). Reset redux: Possible evolutionary pathways towards the transformation of tourism in a COVID-19 world. *Tourism Geographies*, 22(3), 484–490.
- Butler, R. (2018). *Tourism and resilience*. CABI.
- Butler, R. (2019). Overtourism and the tourism area life cycle. In J. Jafari & H. Xiao (Eds.), *Encyclopedia of tourism*. Springer.
- Cheer, J. M., Milano, C., & Novelli, M. (2021). Tourism and social justice: Addressing the emotional solidarity of residents impacted by overtourism. *Sustainability*, 13(5), 2651.
- Dodds, R., & Butler, R. (2019). *Overtourism: Issues, realities and solutions*. De Gruyter Studies in Tourism.
- Dujardin, S., et al. (2021). Sustainable beach management: Lessons from the closure and reopening of Maya Bay, Thailand. *Journal of Coastal Conservation*, 25(1), 18.
- Epler Wood, M. (2017). *Sustainable tourism on a finite planet: Environmental, business and policy solutions*. Routledge.
- González, P., & Moral, P. J. (2020). The role of tourism in sustainable urban development: A case study of Barcelona. *Tourism Management*, 81, 104158.
- Goodwin, H. (2017). The challenge of overtourism. *Responsible Tourism Partnership Working Paper*, 4, 1–19.
- Gössling, S. (2021). The sustainable transformation of tourism: A roadmap. *One Earth*, 4(10), 1367–1370.
- Gössling, S., & Hall, C. M. (2019). *Sustainable tourism: A global perspective*. Routledge.
- Hall, C. M. (2019). Constructing sustainable tourism development: The 2030 agenda and the managerial mindset. *Journal of Sustainable Tourism*, 27(7), 1044–1060.
- Hampton, M. P., & Jeyacheya, J. (2020). Tourism and resilience: Small states, small firms, and the challenges of sustainability. *Annals of Tourism Research*, 83, 102964.
- Higham, J., & Hall, C. M. (2005). Tourism, mobility, and second homes: Emerging issues and policy responses. *Journal of Sustainable Tourism*, 13(5), 395–417.
- Jang, S. (2004). Mitigating seasonality in the tourism industry. *Tourism Management*, 25(2), 229–240.
- Koenig-Lewis, N., & Bischoff, E. E. (2010). Seasonality research: The state of the art. *Tourism Economics*, 16(1), 89–116.
- Koens, K., Postma, A., & Papp, B. (2018). Is overtourism overused? Understanding the impact of tourism in a city context. *Sustainability*, 10(12), 4384.
- Milano, C. (2018). Overtourism and tourismphobia: Global trends and local contexts. *Journal of Tourism Futures*, 4(1), 6–9.

- Milano, C., Cheer, J. M., & Novelli, M. (2019). *Overtourism: Excesses, discontents and measures in travel and tourism*. CABI.
- Nepal, S. K., & Nepal, S. A. (2019). Managing overtourism through sustainable tourism governance: Lessons from Nepal. *Journal of Sustainable Tourism*, 27(7), 1022–1041.
- Peeters, P., et al. (2018). Research for TRAN Committee – Overtourism: Impact and possible policy responses. *European Parliament, Directorate-General for Internal Policies*.
- Scheyvens, R. (2002). *Tourism for development: Empowering communities*. Pearson Education.
- Seraphin, H., Sheeran, P., & Pilato, M. (2018). Overtourism and the fall of Venice as a destination. *Journal of Destination Marketing & Management*, 9, 374–376.
- Sharpley, R. (2020). Tourism, sustainability and the sustainable development goals. *Journal of Sustainable Tourism*, 28(12), 2114–2126.
- Thailand Department of National Parks. (2022). *Maya Bay reopens with new sustainability measures*.
- Tussyadiah, I., Wang, D., Jung, T. H., & Dieck, M. C. T. (2020). Virtual reality, presence, and attitude change: Empirical evidence from tourism. *Tourism Management*, 66, 144–157.
- UNESCO. (2021). *Sustainable tourism and heritage conservation: Lessons from Venice*.
- UNWTO. (2021). *Global report on sustainable tourism*.
- UNWTO. (2022). *Barcelona's sustainable tourism initiatives: A case study*.
- UNWTO. (2023). *Tourism trends and policies*.
- Weaver, D. B. (2016). *Sustainable tourism: Theory and practice*. Routledge.