



Original Article

Artificial Intelligence in Tourism Business Administration: A Regional Perspective on North Maharashtra

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Manuscript ID:

Abstract

JRD -2025(I)-170948

ISSN: 2230-9578

Volume 17

Issue 9(I)

Pp. 217-220

Sept. 2025

Submitted: 9 Aug. 2025

Revised: 20 Aug. 2025

Accepted: 20 Sept. 2025

Published: 30 Sept. 2025

Artificial Intelligence (AI) is reshaping tourism business administration in North Maharashtra, a region known for pilgrimage centers (Shirdi, Trimbakeshwar), heritage sites (Ajanta-Ellora Caves), wine tourism (Nashik), and eco-tourism (Saputara, Malshej Ghats). AI tools—chatbots, predictive analytics, recommendation engines, computer vision, and generative AI—are enabling local tourism businesses (hotels, transport operators, travel agents, and online platforms) to enhance personalization, optimize revenue, and improve service efficiency. Drawing on recent reports (2023–2025) and regional industry insights, this paper integrates market evidence with contextual illustrations from North Maharashtra. It demonstrates revenue and cost impacts for hotels in Shirdi, wine tourism operators in Nashik, and travel services in Ajanta-Ellora. The study concludes with a governance roadmap that aligns AI adoption with customer experience, sustainability, and ESG priorities relevant to regional tourism growth.

Keywords: North Maharashtra, tourism, hospitality, artificial intelligence, business administration, revenue management, pilgrimage tourism, wine tourism, ESG

Introduction

Tourism in North Maharashtra is characterized by diverse segments: pilgrimage (Shirdi, Trimbakeshwar), cultural-heritage (Ajanta-Ellora), leisure (Saputara, Malshej Ghats), and niche wine tourism (Nashik). Post-pandemic, domestic and international arrivals in Shirdi and Ajanta have surpassed 2019 levels (Maharashtra Tourism Development Corporation, 2025). To manage rising demand and visitor expectations, stakeholders—hotels, airlines (to Shirdi/Nashik), and local travel agencies—are deploying AI solutions to improve bookings, customer care, and resource optimization.

Objectives of the Study

1. To map AI use cases across the tourism ecosystem of North Maharashtra, including pilgrimage tourism, wine tourism, heritage sites, and eco-tourism.
2. To analyze revenue and service impacts of AI adoption using numerical illustrations drawn from hotels, OTAs, wineries, and heritage site management.
3. To compile and synthesize market evidence (global, national, and regional) that reflects AI adoption trends relevant to North Maharashtra tourism.



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How to cite this article:

N. B. Salve. (2025). Artificial Intelligence in Tourism Business Administration: A Regional Perspective on North Maharashtra. *Journal of Research & Development*, 17(9(I)), 217-220





4. To develop a governance framework addressing responsible AI practices, ethics, data management, and cultural sensitivities in the regional tourism context.
5. To propose a practical roadmap for AI adoption, tailored to the needs of SMEs, destination managers, and tourism authorities in North Maharashtra.

Research Methodology

This study employs a **descriptive and exploratory research design** to analyze the role of Artificial Intelligence in North Maharashtra's tourism business administration.

Research Design:

- **Exploratory:** to identify emerging AI applications in regional tourism.
- **Descriptive:** to document revenue, service, and efficiency impacts.

Data Sources:

- **Secondary Data:** Reports from MTDC (2024–2025), UN Tourism (2024–2025), NASSCOM (2025), industry research firms (MarketsandMarkets, Grand View Research, TBRC), and peer-reviewed journals.
- **Regional Data:** Tourism footfall statistics for Shirdi, Ajanta-Ellora, and Nashik vineyards (MTDC & Ministry of Tourism, 2025).
- **Case-based Illustrations:** Hypothetical numerical models of Shirdi hotels, Nashik wineries, and Ajanta visitor flows, validated against industry averages.

Analytical Tools:

- Comparative market tables to synthesize global and regional AI projections.
- Numerical revenue models to estimate uplift from AI adoption (hotel RevPAR, OTA conversion, visitor time-savings).
- Conceptual framework mapping AI adoption across the tourism value chain.

Scope and Limitations:

- Focus restricted to **North Maharashtra** (Nashik, Jalgaon, Dhule, Nandurbar).
- Illustrations are **scenario-based** using industry benchmarks, not primary field surveys.
- Results are indicative, intended to guide tourism managers and policymakers.

Market Evidence and Trends

While global AI in tourism is projected to reach **USD 13–14 billion by 2030** (Grand View Research, 2025), Maharashtra Tourism Development Corporation (MTDC, 2025) has earmarked **₹500 crore for digital tourism infrastructure**, including AI-driven visitor management.

Table 1. AI in Tourism—Global vs. North Maharashtra Context

Level	2024 Market Size	2025 Estimate	2030 Projection	CAGR/Notes
Global (Grand View, 2025)	USD 3.37 bn	USD 4.26 bn	USD 13.87 bn	26.7%
India (NASSCOM, 2025 est.)	USD 0.42 bn	USD 0.56 bn	USD 2.0 bn	~29%
North Maharashtra (MTDC)	~₹150 crore	~₹200 crore	~₹650 crore	Driven by pilgrimage & wine tourism AI adoption

Conceptual Model: AI Across the Regional Value Chain

- **Attract (Marketing):** AI-generated campaigns for Shirdi pilgrimage packages, wine trails, eco-tours.
- **Convert (Booking):** Dynamic pricing in Shirdi hotels, vineyard resorts, and Ajanta tours.
- **Serve (On-trip):** Chatbots for darshan updates, queue analytics in Ajanta, AI translation for foreign tourists.
- **Engage & Retain (Post-trip):** Sentiment analysis of Shirdi pilgrimage feedback, loyalty programs for wine tourism.
- **Administer (Back-office):** Revenue forecasting, workforce scheduling in seasonal tourism, ESG reporting for heritage conservation.

Methods for Managerial Assessment

Tourism SMEs in Jalgaon, Dhule, and Nashik can assess AI opportunities by:

1. Framing problems (e.g., reducing crowd wait time in Shirdi, optimizing Nashik festival bookings).



- Auditing data (visitor footfalls, booking platforms, POS data in wineries).
- Running A/B pilots (AI chatbot vs. manual booking).
- Embedding human oversight (AI + local priests' input in Shirdi darshan updates).
- Tracking KPIs (occupancy, service time, NPS, energy consumption).

Numerical Illustrations

1 Shirdi Hotel Revenue Uplift

A 100-room Shirdi hotel (75% occupancy; ADR ₹4,500) adopts AI-based dynamic pricing during Ram Navami festival.

- Baseline rooms sold: $100 \times 30 \times 0.75 = 2,250$
- Baseline revenue: $2,250 \times ₹4,500 = ₹10,125,000$
- Post-AI (occupancy 80%, ADR ₹4,800): $100 \times 30 \times 0.80 \times ₹4,800 = ₹11,520,000$
- Monthly uplift = ₹1,395,000 (+13.8%)
- After AI SaaS costs (~₹200,000/month), net gain = ₹1,195,000.

2 Nashik Wine Tourism Package Personalization

An OTA tests AI itinerary assistant for 50,000 wine tourists. Conversion improves by 0.5 pp, AOV +₹1,000.

- Incremental bookings: 250
- Incremental GMV: $50,000 \times 0.005 \times ₹1,000 = ₹25,000,000$
- With 12% commission, revenue = ₹3,000,000.

3 Ajanta-Ellora Queue Analytics

AI computer vision reduces average wait time from 90 min to 65 min for 20,000 monthly visitors.

- Saved tourist hours = $20,000 \times 25/60 = 8,333$ hours
- Valued at ₹300/hour willingness to pay, total time value = ₹2.5 crore/month.

Implementation Playbook (Regional Use Cases)

Table 2. AI Use Cases in North Maharashtra Tourism

Function	Use Case	Local Application	Outputs	KPIs
Marketing	Campaign optimization	Shirdi festivals, SulaFest ads	ROI uplift	ROAS, CAC
Booking	Dynamic pricing	Shirdi hotels, Nashik resorts	Room/package rates	ADR, RevPAR
Service	Chatbots	Pilgrimage Q&A, darshan timings	Faster responses	CSAT, AHT
Operations	Queue analytics	Ajanta-Ellora caves	Visitor flow alerts	Wait time
ESG	Energy optimization	Hotels in Nashik/Shirdi	HVAC set-points	kWh/room

Discussion

AI adoption in North Maharashtra enhances both **revenue efficiency** (Shirdi hotels, Nashik wineries) and **visitor experience** (Ajanta-Ellora queues, multilingual chatbots). However, challenges include **data fragmentation**, **digital readiness of SMEs**, and **ethical sensitivities** in religious tourism. Shared platforms by MTDC, training programs for local operators, and ethical AI frameworks are essential for equitable adoption.

Conclusion

AI represents a transformative force for North Maharashtra's tourism ecosystem. Shirdi hotels, Nashik wine tourism, and heritage sites like Ajanta-Ellora can benefit through revenue optimization, personalization, and improved visitor management. Managers should start with **low-risk pilots**, build regional **data infrastructure**, and ensure **responsible AI governance** sensitive to cultural contexts. Future research should explore long-term impacts on **pilgrim satisfaction**, **SME competitiveness**, and **sustainability outcomes**.

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