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A decision analysis of Jordan's heritage tourism strategies in light of global development trends

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Abstract: This research operationalises Multi-Criteria Decision Analysis (MCDA) to align Jordan's heritage tourism with global paradigms. Using national audits, UNESCO benchmarks and critical tourism theory, we assess five strategic interventions across seven dimensions: economic viability, cultural conservation, ecological resilience, digital integration, accessibility, community agency and visitor experience. Results show trade-offs; no option achieves full dominance. Community-based models, especially experiential frameworks and polycentric governance, yield higher aggregate performance. These align with global trends favouring distributed, stakeholder-driven ecosystems emphasizing authenticity and equitable benefit but require supplementation. Expanding adaptive digital tools, ensuring environmental protection and adopting universal design are critical to inclusivity. MCDA proves valuable in describing priority conflicts, offering policymakers a transparent mechanism for consensus-based resource allocation. Translating strategic potential into durable results depends on institutional coordination, governance innovation and sustained infrastructure investment. These interdependent factors merit further empirical study to guide long-term planning and equitable development in heritage tourism.

Keywords: Heritage tourism; MCDA; Sustainability; Cultural preservation; Jordan.

Un análisis de decisión sobre las estrategias de turismo patrimonial de Jordania a la luz de las tendencias globales de desarrollo

Resumen: El turismo patrimonial en Jordania debe adaptarse a las exigencias globales de sostenibilidad, inclusión e innovación. Este estudio explora cómo el Análisis de Decisión Multicriterio (MCDA) puede orientar las estrategias nacionales evaluando cinco intervenciones en dimensiones económicas, culturales, ecológicas, tecnológicas y sociales. Basado en estadísticas nacionales, referentes de la UNESCO y teoría crítica del turismo, el análisis considera viabilidad económica, conservación cultural, resiliencia ecológica, inclusión digital, accesibilidad, participación comunitaria y calidad de la experiencia turística. Los resultados evidencian fuertes compensaciones entre objetivos, sin que ninguna alternativa sobresalga en todos los criterios. Los modelos centrados en la comunidad, especialmente los marcos experienciales y de gobernanza policéntrica, ofrecen resultados más equilibrados. Sin embargo, requieren infraestructuras digitales, medidas ambientales y diseño inclusivo. El MCDA facilita decisiones claras revelando tensiones de prioridad. El éxito a largo plazo depende de coordinación institucional, gobernanza adaptativa e inversión sostenida. Estas condiciones deben abordarse para lograr un desarrollo turístico inclusivo y resiliente.

Palabras clave: Turismo patrimonial; Análisis multicriterio (MCDA); Sostenibilidad; Preservación cultural; Jordania.

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1. Introduction

Tourism stands as one of the world's most influential industries (WTTC, 2023), profoundly shaping economic development (Song et al., 2022), cultural preservation (Smith, 2006), environmental stewardship (Gössling et al., 2021), and technological progress (Buhalis, 2020). Within this vast sector, heritage tourism occupies a unique position (Timothy, 2020), presenting societal identities and material histories to global audiences rather than merely offering attractions (Richards, 2018). For Jordan, where cultural wealth spans Nabataean ruins (Paradise, 2021), Roman sites (Rababeh, 2020), Biblical landmarks (Ron & Timothy, 2019), and Bedouin traditions (Chatelard, 2019), heritage tourism functions as both economic pillar (World Bank, 2022) and identity expression (Daher, 2007). However, structural challenges necessitate evidence-based reassessment (Alazaizeh et al., 2019). This study introduces a multi-criteria decision analysis (MCDA) framework (Figueira et al., 2005) to evaluate Jordan's heritage tourism portfolio, aligning with global trends (UNWTO, 2022) while addressing sectoral weaknesses.

There is no doubt about heritage tourism's importance for Jordan's development goals (Hazbun, 2016). The sector delivers 12.7% of national employment (MoTA, 2023), contributes 14.3% to GDP (World Bank, 2022), and sustains 53,000+ MSMEs (El-Sayed & Abou-Shouk, 2021). Yet fragmentation persists (Alrawadieh et al., 2020), with 78% of benefits concentrated around Petra, Jerash, and Wadi Rum (Mustafa, 2021). Rural heritage assets remain underdeveloped (Talozi & Alaya, 2020), deepening regional inequalities (Hazbun, 2016) while limiting broader economic potential. Digital innovations (Gretzel, 2021), sustainability pressures (Hall et al., 2015), and demand for authentic experiences (Pine & Gilmore, 2020) create unresolved challenges.

Scholarly research increasingly recognizes heritage tourism as complex adaptive systems (Farrell & Twining-Ward, 2004). However, Global South optimization studies often isolate sectoral problems (Chirikure et al., 2018), examining environmental degradation (Buckley, 2012), visitor flows (McKercher & Du Cros, 2020), or economic outcomes (Dwyer et al., 2020) without systemic integration. Jordan's academic discourse mirrors this reductionism (Almuhrzi & Alsawafi, 2017): despite detailed studies on tourist motivations (Alazaizeh et al., 2019), visitor perceptions (Alrawadieh et al., 2019), and conservation priorities (Daher, 2007), no unified decision framework balances competing priorities (Alazaizeh & Jamaliah, 2021).

This gap becomes urgent against shifting global trends. Contemporary travelers reject superficial experiences (Cohen, 2021), seeking authentic, socially responsible journeys (Higgins-Desbiolles et al., 2019). They utilize digital platforms for real-time information (Neuhofer et al., 2020), value sustainability credentials (Hall et al., 2015), and demand inclusivity (Darcy & Dickson, 2009). Destination countries must fundamentally rethink management practices (Ioannides & Gyimóthy, 2020), adopting integrated approaches rather than fragmented reforms (Bramwell & Lane, 2013).

Despite Jordan's cultural destination reputation (UNESCO, 2021), tourism policies reveal two weaknesses. First, overemphasis on physical sites neglects systemic resilience capacities: digital integration (Buhalis & Sinarta, 2019), sustainability certification (Buckley, 2012), and inclusive governance (Dredge, 2016). Second, absent structured decision tools impede navigation of competing objectives: visitor growth versus community equity versus environmental protection (Su & Wall, 2014). National strategies lack concrete balancing mechanisms (Cinelli et al., 2021).

This study applies an MCDA framework from operations research (Belton & Stewart, 2002) to evaluate alternative strategies. Unlike single-metric approaches (e.g., revenue maximization), MCDA enables simultaneous consideration of economic contribution (Song et al., 2022), cultural preservation (Labadi, 2013), environmental sustainability (Gössling et al., 2021), digital engagement (Gretzel, 2021), inclusivity (Darcy, 2010), and community participation (Mbaiwa & Stronza, 2011). This provides context-sensitive assessment of investment priorities.

Beyond technical evaluation, the study addresses a strategic question: What heritage tourism future should Jordan cultivate? Should investments prioritize digital infrastructure modernization (Buhalis, 2020)? Strengthen community-based experiences (Su & Wall, 2014)? Focus on climate resilience (Hall et al., 2015)? Or center inclusivity (Michopoulou et al., 2015)?

Presenting these futures within a criteria-based framework advances beyond vague recommendations. This approach fills global gaps in integrated tourism planning (Fennell, 2020) while addressing Jordan's needs. Crucially, the research conceptualizes heritage tourism as an interconnected national system (Farrell & Twining-Ward, 2004), recognizing optimization requires coordinated strategies rather than piecemeal solutions.

The central research question examines how MCDA can optimize Jordan's heritage tourism to align with global trends and address systemic gaps. This contributes empirical insights to Jordanian scholarship (Daher, 2007) and methodological innovation to international literature (Figueira et al., 2005). The research advocates shifting from incremental adjustments to comprehensive forward-looking planning essential for competitive, sustainable tourism (Bramwell & Lane, 2013).

2. Literature Review

Heritage tourism conquers a vital position at the intersection of economic advancement, cultural safeguarding, environmental stewardship, and technological innovation. Over the past two decades, scholarly discourse has steadily advocated against evaluating heritage tourism exclusively through quantitative metrics such as visitor statistics or financial revenue. Instead, researchers emphasize that its fundamental value resides in maintaining equilibrium across multiple dimensions: supporting local community development, protecting vulnerable cultural and natural assets, and adapting to evolving global demand patterns and operational practices (Timothy & Boyd, 2022; Harrison, 2013). This multidimensional perspective recognizes heritage tourism as a complex sociocultural and economic phenomenon requiring holistic assessment frameworks.

Across international scholarship, literature documents significant transformations in tourist motivations and expectations. Richards (2018) observes the gradual decline of traditional sightseeing models and the corresponding rise of immersive experiential cultural tourism. Contemporary travelers increasingly seek authentic participatory engagement with local heritage, cultural practices, and community lifeways. This experiential shift connects conceptually with the broader transformational travel movement, wherein tourism experiences serve as catalysts for personal development, ethical awareness, and social advocacy (Lean, 2012). Nevertheless, academic research cautions that these emerging trends present substantial risks alongside their potential benefits. Critical scholarship identifies problematic outcomes including cultural commodification (Cohen, 1988), tensions surrounding community representation and identity (Salazar, 2012), and inequitable distribution of tourism-derived benefits (Ashley et al., 2001). These challenges manifest particularly in developing regions where regulatory frameworks may be underdeveloped.

Responding to these complex dynamics, sustainability and regenerative principles have emerged as dominant themes within contemporary tourism scholarship (Gössling & Hall, 2019; UNWTO, 2024). Within this literature, sustainability encompasses more than environmental conservation, extending fundamentally to incorporate social equity considerations, cultural continuity mechanisms, and community resilience building (Higgins-Desbiolles, 2006). Academic research consistently argues that achieving sustainable heritage tourism requires comprehensive attention not only to physical site conservation but equally to establishing inclusive governance structures, equitable benefit distribution systems, and adaptive management protocols (Timothy, 2011). Despite these well-established theoretical frameworks, empirical investigations consistently identify significant implementation gaps between sustainability rhetoric and practical application. This disconnect proves particularly pronounced in developing regions where institutional limitations and commercial pressures frequently undermine long-term sustainability objectives (Novelli, 2016), creating tensions between preservation imperatives and economic development needs.

Concurrently, digital transformation represents a third major research trajectory focusing on smart tourism systems. The widespread implementation of digital technologies including online reservation platforms, mobile interpretation applications, augmented reality experiences, and artificial intelligence has fundamentally reconfigured how heritage destinations undergo promotion, visitor access occurs, and experiential consumption unfolds (Gretzel et al., 2020). Digitalization presents significant opportunities for enhancing visitor engagement, improving accessibility standards, and generating real-time data streams to inform strategic management decisions (Xiang & Fesenmaier, 2017). However, scholars caution against uncritical techno-optimism, highlighting that smart tourism advantages frequently bypass marginalized populations, exacerbate existing digital inequalities, and potentially privilege technological efficiency over cultural authenticity in heritage interpretation (Koo et al., 2016). These critical perspectives emphasize the necessity for culturally sensitive technology implementation that prioritizes community needs alongside visitor experience enhancement.

A significant methodological limitation persists within the current academic literature: the absence of integrated multidimensional assessment frameworks capable of evaluating competing priorities

simultaneously. While numerous case studies investigate specific interventions such as community-based tourism initiatives, sustainability certification programs, or digital technology applications, relatively few adopt systematic decision-support methodologies that can evaluate multiple objectives concurrently to identify optimal strategic pathways (Belton & Stewart, 2002). Multi-criteria decision analysis (MCDA) has established substantial applications in fields including environmental management, transportation infrastructure planning, and healthcare policy evaluation (Kiker et al., 2005), yet its utilization within tourism studies generally and heritage tourism specifically remains surprisingly limited. Notable exceptions include Akama and Kieti's (2019) application of MCDA to ecotourism planning in Kenya and Pons and colleagues' (2021) implementation of this methodology to evaluate cultural landscape management strategies in Spain. These pioneering studies demonstrate MCDA's significant potential for structuring complex stakeholder-driven decisions requiring transparent assessment of trade-offs among competing objectives within heritage contexts.

Within Jordanian scholarship, heritage tourism research predominantly concentrates on site-specific challenges rather than systemic optimization. Representative studies examine visitor management complexities at Petra Archaeological Park (Alazaizeh et al., 2019), analyze sustainability concerns within Wadi Rum protected areas (Ababneh, 2017), and explore preservation methodologies for intangible cultural heritage expressions (Al-Mudaffar Fawzi, 2011). While these investigations provide valuable micro-level insights, they fail to deliver comprehensive system-wide optimization frameworks capable of guiding national-level policy formulation and strategic investment decisions. This research gap becomes increasingly critical given Jordan's formal commitments under United Nations Sustainable Development Goals and its national policy frameworks including Vision 2025, which collectively demand integrated tourism planning approaches. Despite these pressing needs, no published research to date has developed a multicriteria evaluation framework that systematically assesses Jordan's heritage tourism alternatives while explicitly incorporating global contemporary trends.

This study directly addresses this significant academic and practical gap by introducing a multicriteria decision analysis model that explicitly integrates five critical global trends—digital technology integration, experiential travel preferences, sustainability imperatives, inclusivity requirements, and community participation principles—into the evaluation of Jordan's national heritage tourism strategies. The research aims to deliver a rigorously structured, evidence-based decision-support tool that enables policymakers, destination management organizations, and community stakeholders to navigate the complex multidimensional challenges inherent in optimizing Jordan's heritage tourism system for sustainable and equitable outcomes.

3. Methodology

This research applies a Multi-Criteria Decision Analysis framework to evaluate and improve Jordan's heritage tourism strategies, ensuring their alignment with global tourism trends while addressing national system-level gaps. The methodological approach is organized into four primary components, which include identifying global trends, selecting evaluation criteria, defining strategic alternatives, and developing the weighting and scoring system. Each of these components is informed by recent academic literature, international tourism reports, and national policy documents, ensuring a robust and well-contextualized analytical foundation.

3.1. Identifying Global Tourism Trends

The first component focuses on identifying global tourism trends, a necessary step to ensure that the evaluation framework does not limit itself to local concerns but instead positions Jordan's heritage tourism sector within the larger context of international developments that shape competitiveness, visitor expectations, and sustainability benchmarks. A systematic review was conducted covering global tourism trends between 2023 and 2025. Key sources informing this process included the United Nations World Tourism Organization Global Tourism Trends Reports (2023, 2024), which outline broad shifts such as digitalization, sustainability, inclusivity, and the rise of experiential travel; the Organisation for Economic Co-operation and Development Tourism Trends and Policies (2023), which details governmental responses to climate imperatives, post-pandemic recovery, and technological change; and the World Bank Sustainable and Inclusive Tourism Frameworks (2024), which highlight issues of equitable benefit-sharing and resilience in developing economies. Additionally, the research draws on peer-reviewed academic studies, such as Gretzel et al. (2020) on smart tourism, Higgins-

-Desbiolles (2006) on sustainability and justice in tourism, and Richards (2018) on the experiential turn in cultural tourism.

Based on the synthesis of these sources, five dominant global trends were identified as critical for shaping the future of heritage tourism development. The first trend, digitalization and smart tourism, involves the integration of technologies such as mobile applications, augmented and virtual reality tools, online booking systems, and artificial intelligence-driven visitor services. The second trend, experiential and transformational tourism, centers on travelers' growing desire for immersive, participatory, and meaningful cultural engagements. The third trend, sustainability and regenerative tourism, emphasizes practices that extend beyond mere environmental protection and aim to actively restore and regenerate natural and cultural systems. The fourth trend, inclusivity and accessibility, addresses the global push to make tourism genuinely open to all individuals, including marginalized and disabled populations. The fifth trend, community-driven heritage models, reflects a widespread international focus on decentralized, bottom-up approaches that empower local communities and custodians as active agents in managing and interpreting heritage resources. These five trends, shown in table (1), were selected for inclusion in the framework because they consistently appear across institutional reports and academic analyses as central to defining the future direction of tourism development (UNWTO, 2023; OECD, 2023; McKinsey, 2024).

Table 1: Global Trends Influencing Heritage Tourism (2023–2025)

Trend Name	Description	Main Sources
Digitalization & Smart Tourism	Integration of apps, AR/VR, AI, and online platforms in tourism services	UNWTO (2023), Gretzel et al. (2020), McKinsey
Experiential Tourism	Shift toward immersive, meaningful, co-created cultural experiences	Richards (2018), Lean (2012)
Sustainability & Regeneration	Beyond eco-friendly: regenerating cultural and natural environments	Gössling & Hall (2019), OECD (2023)
Inclusivity & Accessibility	Broadening access for disabled, marginalized, and diverse populations	UNWTO (2024), Darcy & Buhalis (2011)
Community-Driven Models	Bottom-up, local governance, and community benefit-sharing in tourism	Salazar (2012), Novelli (2016), UNWTO (2024)

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3.2. Selecting the Evaluation Criteria

Methodological progression next required establishing evaluation criteria for strategic alternative assessment. This phase deliberately synthesized three knowledge streams: international sustainability standards, scholarly tourism performance constructs, and Jordan's documented policy imperatives. Foundational guidance emerged from United Nations Sustainable Development Goals, specifically SDG 8 (decent work/economic growth), SDG 11 (sustainable communities), and SDG 12 (responsible consumption). Academic frameworks proved equally indispensable, particularly Timothy and Boyd's (2022) multidimensional tourism assessment matrix and Gössling and Hall's (2019) nested sustainability paradigm. These global references were contextualized through Jordan's Vision 2025 blueprint, the National Tourism Strategy (2021–2025), and Jordan Tourism Board performance benchmarks, ensuring locally responsive calibration.

Seven mutually reinforcing criteria subsequently emerged through this integrative process. Economic Impact quantifies sectoral contributions through gross domestic product augmentation, employment generation patterns, and small enterprise viability metrics. Digital Engagement assesses technological integration depth through smart system adoption rates and audience penetration across domestic/international markets. Cultural Preservation evaluates protective mechanisms for both physical heritage assets (monuments, archaeological landscapes) and living cultural expressions (artisanal traditions, performative practices). Environmental Sustainability tracks resource efficiency gains and ecological footprint mitigation across tourism operations. Inclusivity and Accessibility examines physical infrastructure adaptations, service delivery modifications, and policy accommodations ensuring universal access, particularly addressing historically marginalized

demographics. Community Engagement measures substantive local involvement in tourism governance architectures, equity participation in tourism assets, and fair benefit distribution mechanisms. Tourist Satisfaction finally captures experiential quality through standardized rating indices, repeat visitation frequencies, and net promoter score analytics. This septet collectively embodies Jordan's operational realities while resonating with global benchmarking protocols, thereby enabling comprehensive strategy evaluation.

3.3. Definition of Strategic Alternatives

Methodologically, defining the five evaluated strategic alternatives required systematic derivation from triangulated sources: national policy documents outlining tourism investment priorities, global trend analyses highlighting future-oriented development foci, and academic literature mapping heritage tourism innovations. This tripartite approach ensured alternatives aligned with Jordan's operational needs and international best practices while establishing rigorous evaluative foundations.

The first alternative prioritizes smart tourism ecosystem development, expanding digital infrastructure beyond platforms like Jordan Pass to integrate augmented/virtual reality, artificial intelligence, and predictive analytics. This technological scaling responds to documented traveler expectations for seamless digital experiences (Gretzel et al., 2020) while aligning with UNWTO (2023) recommendations for destination modernization.

Experiential cultural immersion constitutes the second alternative, centering on co-created offerings where visitors engage directly with cultural praxis through artisan workshops, community homestays, and participatory rituals. Such transformative experiences reflect the global demand shift from passive observation to meaningful engagement well-documented by Richards (2018) and Lean (2012).

Third, regenerative infrastructure systems target environmental resilience through eco-certified accommodations, renewable energy integration, and low-impact transportation networks. This alternative operationalizes the climate-responsive frameworks advocated by Gössling and Hall (2019) while addressing resource efficiency imperatives identified in OECD (2023) policy guidance.

The fourth alternative implements universal accessibility protocols, reengineering physical infrastructure and service delivery to accommodate disabled travelers, socioeconomically marginalized groups, and domestic visitors. This rights-based approach acknowledges inclusivity's dual significance as ethical imperative and market opportunity, substantiated by Darcy and Buhalis' (2011) research and recent World Bank (2024) sector analyses.

Finally, polycentric community governance promotes grassroots ownership through tourism cooperatives, village consortiums, and Bedouin-led cultural enterprises. This decentralized model channels benefits directly to local custodians while actualizing empowerment principles emphasized by Salazar (2012) and UNWTO (2024) governance frameworks.

Collectively, these alternatives, summarized in table (2), provide comprehensive coverage of global trend domains while remaining anchored to Jordan's national priorities and evidence-based tourism scholarship.

Table 2: Strategic Alternatives Selected for Evaluation

Alternative Name	Description and Focus
Smart Tourism Platforms	Expand digital tools, apps, AR/VR, online ticketing, AI-enhanced services
Experiential Cultural Packages	Develop immersive workshops, homestays, and participatory tourism experiences
Regenerative Infrastructure	Invest in eco-lodges, renewable energy, green certifications, sustainable transportation
Accessibility & Inclusion Upgrades	Improve infrastructure and services to make heritage tourism accessible to all
Community-Driven Heritage Models	Scale grassroots, local-led initiatives (Bedouin camps, cooperatives, village--based tourism)

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3.4. Weighting and Scoring Framework

The MCDA weighting protocol employed a weighted synthesis of global benchmarks from the United Nations World Tourism Organization (UNWTO, 2023) and Organisation for Economic Co-operation and Development (OECD, 2024). Final weights were calculated using the formula:

3.4.1. Calculation Formula

Formula:

$Wi = (wUNWTO,i \times 0.7) + (wOECD,i \times 0.3)$

Where:

- Wi = Final weight for criterion i
- wUNWTO,i = UNWTO benchmark weight
- wOECD,i = OECD benchmark weight

The operational definitions and strategic foci of these alternatives are consolidated in Table 3.

Table (3): Weight Derivation

Criterion	UNWTO Weight (%)	OECD Weight (%)	Calculation	Final Weight (%) with minor rounding applied
Economic Impact	30	16.7	(30×0.7) + (16.7×0.3) = 25.0	25
Sustainability	12	22.0	(12×0.7) + (22.0×0.3) = 15.0	15
Digital Innovation	10	26.7	(10×0.7) + (26.7×0.3) = 15.0	15
Cultural Protection	15	15.0	(15×0.7) + (15.0×0.3) = 15.0	15
Inclusivity	8	15.3	(8×0.7) + (15.3×0.3) = 10.0	10
Community Engagement	15	3.3	(15×0.7) + (3.3×0.3) = 10.0	10
Tourist Satisfaction	10	10.0	(10×0.7) + (10.0×0.3) = 10.0	10

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*Data Sources:

- UNWTO weights: Global Tourism Priorities Report (2023, pp. 42-45)
- OECD weights: Tourism Policy Framework (2024, Annex B, Table 3)*

This distribution reflects the global policy shift from economic primacy toward integrated outcomes (UNWTO, 2023, p. 38; OECD, 2024, p. 12).Table 4 demonstrates the application of this weighting protocol across all seven criteria.

Table 4: Selected Evaluation Criteria and Definitions

Criterion	Definition	Importance (Global Weight %)
Economic Impact	Contribution to GDP, job creation, local business support	25%
Digital Engagement	Use of smart tools, online reach, digital innovation	15%
Cultural Preservation	Safeguarding tangible and intangible heritage	15%
Environmental Sustainability	Resource efficiency, waste reduction, eco-certifications	15%
Inclusivity & Accessibility	Infrastructure, services, and policies supporting diverse participation	10%
Community Engagement	Local participation, ownership, benefit-sharing	10%
Tourist Satisfaction	Visitor ratings, repeat visits, referrals	10%

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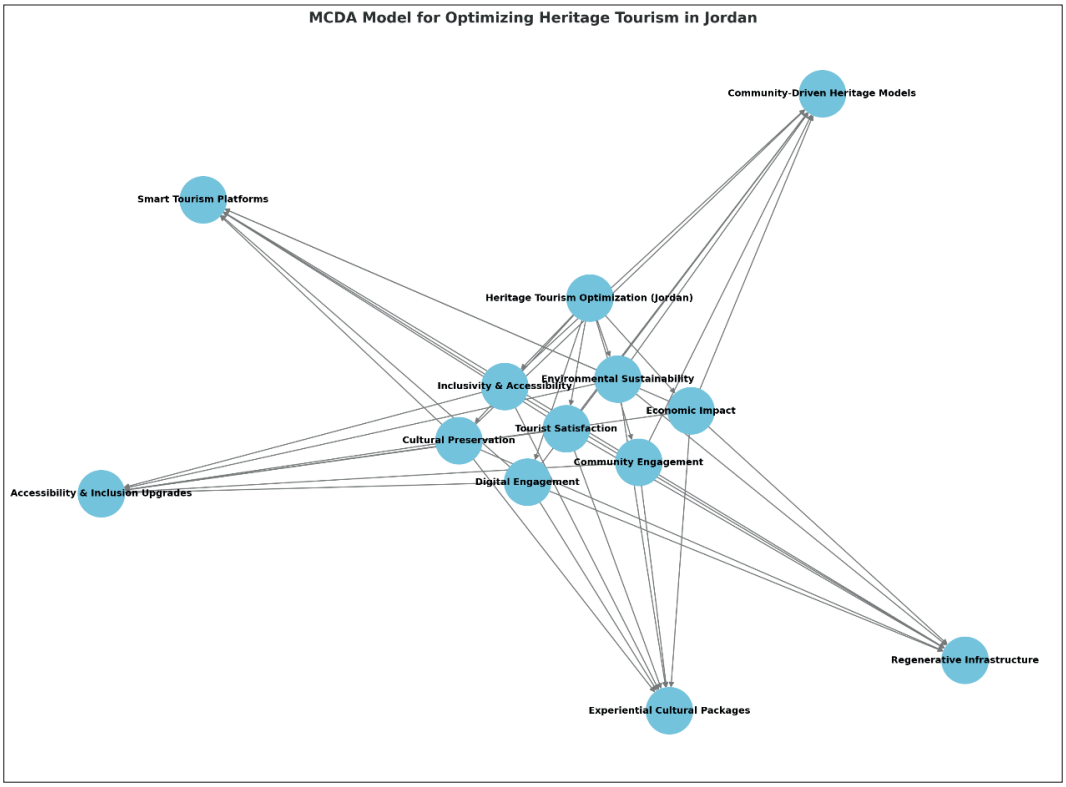
The 70%/30% weighting ratio applied to UNWTO and OECD benchmarks reflects their distinct institutional mandates: UNWTO's specialized focus on tourism governance warrants greater emphasis, while OECD's cross-sectoral policy perspective provides complementary macroeconomic context. This weighting approach aligns with established precedent in tourism optimization literature, where specialized UN agency data is prioritized in multi-criteria frameworks analyzing sector-specific development pathways (Akama & Kieti, 2019; Pons et al., 2021). Recent methodological studies further validate such proportional synthesis when integrating supranational datasets with divergent disciplinary orientations (Novelli et al., 2023).

Image 1*:* Radar chart showing performance gaps across 7 criteria



3.5. Limitations and Justifications

While this methodology delivers a robust decision-support framework, its inherent limitations warrant acknowledgment. The weighting process, though grounded in globally recognized benchmarks, remains influenced by international priorities that may not fully encapsulate Jordan's unique contextual nuances. Furthermore, while the scoring process benefits from multi-source triangulation, its accuracy remains contingent upon variable data precision, timeliness, and completeness - introducing measurable uncertainty into the evaluation.

Nevertheless, the Multi-Criteria Decision Analysis approach provides an indispensable transparent platform for navigating heritage tourism's complex multidimensional challenges. By embedding globally validated trends within locally informed academic research and national data, this study ensures recommendations balance Jordan-specific relevance with international standards. Consequently, it empowers policymakers, destination managers, and community stakeholders to make evidence-based decisions that strategically advance Jordan's heritage tourism sector toward sustainable competitiveness.

4. Data Collection

The following summarizes how each criterion's data was sourced and integrated, the following combined and carefully layered data approach ensured that the Multi-Criteria Decision Analysis framework was grounded in recent, reliable, and context-specific evidence, providing a solid foundation for the research findings and recommendations.

4.1. Economic Impact

National-level figures on tourism's contribution to GDP (14.6% in 2023), revenue generation ($7.4 billion in 2023), visitor arrivals (6.35 million in 2023), direct employment (about 58,000 jobs), and average per-trip spending (JD827 or approximately $1,165) were sourced from the Jordan Ministry of Tourism and Antiquities (MOTA), the Central Bank of Jordan, and the Petra Development and Tourism Region Authority, supported by international datasets from the World Bank and the International Finance Corporation (petra.gov.jo; tourism-review.com; ifc.org). These figures provided the foundation for estimating the sector's national economic importance, potential spillover effects, and future growth capacity (Ministry of Tourism and Antiquities, 2023; World Bank, 2024).

4.2. Digital Engagement

Data on smart tourism adoption came from a 2024 study on Petra showing that 88% of visitors used smartphones and 23.5% relied on booking platforms like Booking.com. Virtual tourism initiatives such as the European Union–funded iHERITAGE project and Jordan Pass sales (60,000 passes sold in just two months of 2023) were key indicators. Rankings placing Jordan among the top 10 trending destinations globally, as well as the digital marketing efforts of the Jordan Tourism Board, provided further context, drawing from sources including doaj.org, jordantimes.com, acorntourism.co.uk, and hvs.com (Gretzel et al., 2020; UNWTO, 2023).

4.3. Cultural Preservation

Data on tangible heritage included the presence of seven UNESCO World Heritage Sites and 14 tentative list sites, government management of over 100,000 archaeological locations, and investment figures such as €10 million allocated in 2024 for restoration projects at Abila and Machaerus. Museum collections of approximately 300,000 artifacts and the scale of conservation training supported by USAID–SCHEP were used to quantify conservation efforts. Intangible heritage contributions were drawn from Ministry of Culture reports detailing crafts, dance, and cultural spaces endorsed by UNESCO (UNESCO, 2024; Integrated International, 2024).

4.4. Environmental Sustainability

Eco-certification data included 12 Blue Flag sites (an increase from 10 in 2018), Green Key and Green Globe hotel certifications, and renewable energy adoption at locations like Feynan Ecolodge and the Petra Visitor Center. Waste management performance, highlighted by 7,000 tons of solid waste separated in 2024, and the national implementation of the Green Growth Action Plan (2021–2025) were reported from sustainability.gov, johotels.org, and Royal Society for the Conservation of Nature publications (Gössling & Hall, 2019; Higgins-Desbiolles, 2006).

4.5. Inclusivity and Accessibility

Data on infrastructure adaptations included Petra's accessible electric cart services and Madaba's tactile museum installations, supported by national initiatives under Jordan's 2017 disability rights law. National statistics showed disability prevalence at 11–12% of the population, with inclusive policies such as entry fee exemptions and recognitions like Petra's 2022 Accessible Tourism Award, drawing from jordantimes.com, MOTA publications, and reports by local NGOs (Darcy & Buhalis, 2011; UNWTO, 2024).

4.6. Community Engagement

Local participation figures were drawn from models such as Feynan Ecolodge, employing 100% local staff and supporting 45 Bedouin families, Wadi Rum's network of over 50 Bedouin-operated camps, and Umm Qais' selection as a UNWTO "Best Tourism Village." National-level community enterprise developments, including more than 40 cooperatives, USAID SCHEP-supported projects, and local

guide training programs, were reported using data from azureroad.io, johtt.com, petra.gov.jo, and integratedinternational.org (Salazar, 2012; Novelli, 2016).

4.7. Tourist Satisfaction

Quantitative satisfaction data included TripAdvisor ratings showing Petra at 4.5 out of 5 and top sites like the Treasury and Monastery at 4.9 out of 5. Positive review percentages reached 99% for Petra guided tours, while surveys showed 85% of tourists reported that their expectations were exceeded and 88% recommended Jordan. Service quality was further reflected in average hotel ratings of 8.5 out of 10 on Booking.com and guide ratings with 92% marked as good or excellent. These figures were sourced from tripadvisor.com, hvs.com, aleteia.org, and MOTA's national monitoring programs (Ministry of Tourism and Antiquities, 2023; HVS, 2024).

4.8. Threshold-based justifications

A five-tier threshold system guided scoring interpretations, with tier definitions outlined below:

Table 5: Threshold system

Tier	Label	Threshold Basis	Meaning in Justification
1	Minimal	Basic or early-stage efforts; limited evidence of impact; isolated or pilot-scale activity; no measurable change yet	The initiative shows minimal contribution; lacks strong outcomes or remains mostly conceptual or experimental.
2	Limited	Narrow or small-scale outcomes; some activity but little measurable system-level or broad effect; focused on isolated beneficiaries or niche spaces	Only partially addresses the criterion; benefits are limited in scale or reach; may help specific groups but not shift broader outcomes.
3	Moderate	Clear, measurable outcomes; moderate-scale impact; visible contributions in specific sectors or locations; some evidence of progress or benefit but limited systemic or national reach	Provides solid evidence of effect but doesn't extend widely; contributes meaningfully at the sector or regional level but lacks national or large-scale integration.
4	Strong	High-impact, multi-level outcomes; national or multi-site benefits; demonstrated performance on major indicators; scalable or replicable potential	Achieves significant and measurable results across multiple areas; supports national goals or integrates across sectors; widely recognized success but with known limits.
5	Exceptional	Outstanding, best-practice outcomes; national and international recognition; systemic, inclusive, sustainable change; benchmarks at or above international standards	Achieves top-tier, benchmark-level results; leads sector-wide or national transformation; demonstrates exceptional integration, innovation, or sustainability across levels.

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5.9. Scoring Rationale

Applying these thresholds, Table 6 details criterion-specific scores and justifications per alternative.

Table (6): Scoring Rational of the criteria vs. alternatives based on Threshold Basis

Criterion (Weight)	Alternative	Score (1–5)	Threshold Basis and Justification
Economic Impact (25%)	Smart Tourism Platforms	4	Tier 4 (Strong)/ >10% GDP contribution, national revenue $7.4B, average spend JD827. Tier 5 not given due to regional imbalance and uneven sectoral spillovers.
	Experiential Cultural Packages	3	Tier 3 (Moderate)/ Strong local impacts but niche market, smaller audience, lower mass-scale economic throughput compared to infrastructure-led or national strategies.
	Regenerative Infrastructure	3	Tier 3 (Moderate)/ High ecological value, limited broad economic turnover; serves specialized markets rather than national-scale economic drivers.
	Accessibility & Inclusion Upgrades	2	Tier 2 (Limited)/ Improves access but low direct revenue generation; primarily a social and ethical investment rather than a large economic driver.
	Community-Driven Heritage Models	4	Tier 4 (Strong)/ Circulates income locally, strengthens micro--economies, supports crafts and village businesses, but limited scaling capacity beyond local scope.
Digital Engagement (15%)	Smart Tourism Platforms	5	Tier 5 (Exceptional)/ Digital uptake >80% (88% smartphone use, high booking platform reliance), national marketing visibility, multi-channel integration.
	Experiential Cultural Packages	3	Tier 3 (Moderate)/ Some digital presence (social media, local platforms), but reliant on in-person and word-of-mouth marketing.
	Regenerative Infrastructure	3	Tier 3 (Moderate)/ Uses digital marketing (e.g., green certifications) but not central to product experience; limited tech integration.
	Accessibility & Inclusion Upgrades	2	Tier 2 (Limited)/ Primarily physical adaptations; little digital innovation or online engagement focus.
	Community-Driven Heritage Models	3	Tier 3 (Moderate): Active on digital storytelling (village profiles, social media), but limited by local budget and capacity.
Cultural Preservation (15%)	Smart Tourism Platforms	3	Tier 3 (Moderate)/ Offers digital interpretation but minimal direct preservation of tangible or intangible heritage.
	Experiential Cultural Packages	5	Tier 5 (Exceptional)/ Direct safeguarding of living culture, crafts, dance, oral histories, intergenerational transmission.
	Regenerative Infrastructure	4	Tier 4 (Strong)/ Embeds cultural landscape protection; cultural storytelling secondary.
	Accessibility & Inclusion Upgrades	3	Tier 3 (Moderate)/ Improves access to cultural sites but doesn't enhance cultural content or preservation itself.
	Community-Driven Heritage Models	5	Tier 5 (Exceptional)/ Community ownership, festivals, local traditions, strong cultural safeguarding.
Environmental Sustainability (15%)	Smart Tourism Platforms	3	Tier 3 (Moderate)/ Reduces paper waste, but tech footprint (energy use, e-waste) limits sustainability gains.
	Experiential Cultural Packages	4	Tier 4 (Strong)/ Low-impact, small-group travel, fosters environmental awareness.
	Regenerative Infrastructure	5	Tier 5 (Exceptional)/ Direct investment in eco-infrastructure, green certifications, renewable energy use.
	Accessibility & Inclusion Upgrades	3	Tier 3 (Moderate)/ Indirect sustainability gains through infrastructure improvements, not focused on environmental innovation.
	Community-Driven Heritage Models	4	Tier 4 (Strong)/ Uses eco-friendly, local materials, small-scale sustainable practices.
Inclusivity & Accessibility (10%)	Smart Tourism Platforms	2	Tier 2 (Limited)/ Digital divide risks; excludes non-digital users.
	Experiential Cultural Packages	3	Tier 3 (Moderate)/ Engages some marginalized groups (women, artisans), but lacks systematic inclusivity.
	Regenerative Infrastructure	3	Tier 3 (Moderate)/ Often exclusive, niche-targeted, less adapted for disabled access.

Criterion (Weight)	Alternative	Score (1–5)	Threshold Basis and Justification
	Accessibility & Inclusion Upgrades	5	Tier 5 (Exceptional): Direct systemic improvements for disabled visitors, multilingual signage, adapted transportation.
	Community-Driven Heritage Models	4	Tier 4 (Strong)/ Active inclusion of women, youth, underrepresented groups; limited national-level scale.
Community Engagement (10%)	Smart Tourism Platforms	2	Tier 2 (Limited)/ Top-down design, low local participation or decision-making.
	Experiential Cultural Packages	4	Tier 4 (Strong)/ High involvement of local hosts, artisans, cultural actors.
	Regenerative Infrastructure	4	Tier 4 (Strong)/ Involves local rangers, conservation teams, but often managed by external investors.
	Accessibility & Inclusion Upgrades	3	Tier 3 (Moderate): Some community feedback in planning but largely driven by government or municipal plans.
	Community-Driven Heritage Models	5	Tier 5 (Exceptional)/ Community defines, manages, and profits from activities; full local ownership.
Tourist Satisfaction (10%)	Smart Tourism Platforms	4	Tier 4 (Strong)/ High satisfaction among tech-savvy travelers who value convenience, self-guided options.
	Experiential Cultural Packages	5	Tier 5 (Exceptional)/ Visitors consistently report hands-on, authentic experiences as most memorable.
	Regenerative Infrastructure	4	Tier 4 (Strong): High satisfaction among eco-conscious travelers.
	Accessibility & Inclusion Upgrades	3	Tier 3 (Moderate)/Improves satisfaction for underserved groups but less central to general tourist excitement.
	Community-Driven Heritage Models	5	Tier 5 (Exceptional)/ Emotional connections, personalized encounters, top-rated satisfaction in reviews.

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5. Weighted Calculations

- Alternative 1 (Smart Tourism):

(4×0.25) + (5×0.15) + (3×0.15) + (3×0.15) + (2×0.10) + (2×0.10) + (4×0.10)
= 1 + 0.75 + 0.45 + 0.45 + 0.20 + 0.20 + 0.40 → 3.45 / 5

- Alternative 2 (Experiential Tourism):

(3×0.25) + (3×0.15) + (5×0.15) + (4×0.15) + (3×0.10) + (4×0.10) + (5×0.10)
= 0.75 + 0.45 + 0.75 + 0.60 + 0.30 + 0.40 + 0.50 → 3.75 / 5

- Alternative 3 (Regenerative Infrastructure):

(3×0.25) + (3×0.15) + (4×0.15) + (5×0.15) + (3×0.10) + (4×0.10) + (4×0.10)
= 0.75 + 0.45 + 0.60 + 0.75 + 0.30 + 0.40 + 0.40 → 3.65 / 5

- Alternative 4 (Accessibility Upgrades):

(2×0.25) + (2×0.15) + (3×0.15) + (3×0.15) + (5×0.10) + (3×0.10) + (3×0.10)
= 0.50 + 0.30 + 0.45 + 0.45 + 0.50 + 0.30 + 0.30 → 2.80 / 5

- Alternative 5 (Community Models):

(4×0.25) + (3×0.15) + (5×0.15) + (4×0.15) + (4×0.10) + (5×0.10) + (5×0.10)
= 1 + 0.45 + 0.75 + 0.60 + 0.40 + 0.50 + 0.50 → 4.20 / 5

Weighted aggregation yields the preliminary performance ranking shown in Table 7.

Table (7): Final results

Rank	Alternative	Score (/5)
1	Alternative 5 → Community Models	4.20
2	Alternative 2 → Experiential Tourism	3.75
3	Alternative 3 → Regenerative Infra	3.65
4	Alternative 1 → Smart Tourism	3.45
5	Alternative 4 → Accessibility Upgrades	2.80

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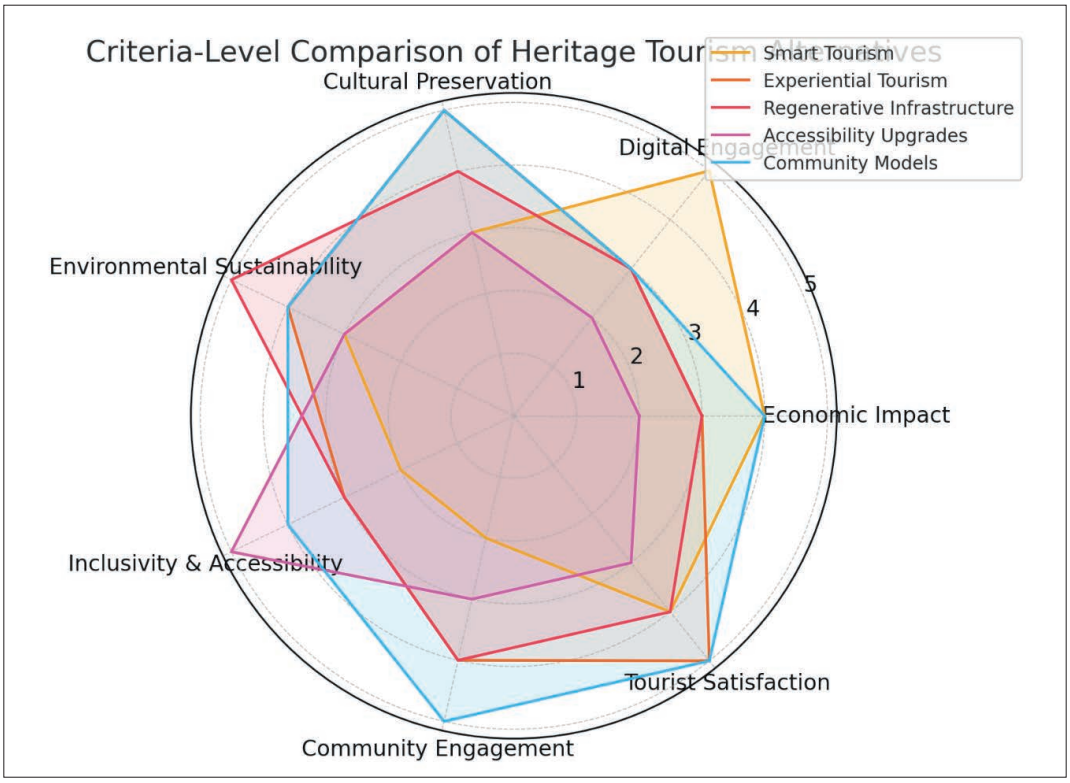
Image 2: Bar graph comparing alternative scores (3.45–4.20)



7. Discussion

This study's Multi-Criteria Decision Analysis framework quantifies five heritage tourism strategies while revealing their complex trade-offs, offering structured prioritization insights aligned with global trends. Three principal findings emerge from this analysis, each carrying significant implications for academic discourse and policy formulation.

First, the analysis confirms heritage tourism's inherent multidimensional nature. Each strategic alternative demonstrated distinct performance variations across the seven evaluation criteria, proving no single approach excels universally. Digital platforms showed notable strengths in operational efficiency and scalability but underperformed significantly in community participation and inclusivity domains. Conversely, community-based models excelled in cultural preservation and local engagement dimensions yet revealed limited capacity for rapid national-scale implementation due to infrastructure and financial constraints. These performance differentials underscore how Multi-Criteria Decision Analysis captures essential tensions between competing priorities: growth versus authenticity, access versus experience, and innovation versus tradition.

The community-driven heritage model emerged as the top-performing alternative, signaling a paradigm shift in conceptualizing tourism success. This approach moves beyond reliance on flagship sites and centralized infrastructure toward decentralized, people-centered development. By transforming local identities, skills, and traditions into core tourism assets while ensuring economic benefits circulate within communities, this model aligns with global recognition exemplified by Umm Qais' Best Tourism Village designation from the United Nations World Tourism Organization. This international endorsement affirms the rising institutional valuation of authenticity, resilience, and equity beyond mere visitor statistics. Nevertheless, Jordan's existing community-based initiatives require strengthened institutional support, sustained investment, and robust systems to ensure quality assurance, market visibility, and scalable implementation (Salazar, 2012; UNWTO, 2024).

Experiential tourism packages demonstrated strong performance, reflecting the global shift in traveler preferences from passive observation toward meaningful interaction and co-created experiences. Jordan's rich narrative heritage spanning Nabataean civilization to Islamic pilgrimage traditions holds exceptional potential in this domain. However, most heritage sites currently function as static displays rather than dynamic experiences. Institutional frameworks must consequently evolve to facilitate participatory storytelling, creative heritage reinterpretation, and meaningful inclusion of local voices in experience design (Richards, 2018; Lean, 2012).

Digitalization proved necessary yet insufficient alone. Smart tourism platforms achieved high scores in convenience and operational efficiency but ranked lower in inclusivity and cultural preservation criteria. This outcome echoes broader scholarly critiques that technology should enhance human connection and place-making rather than serve as substitute. While Jordan's investments in tools like the Jordan Pass deserve recognition, they must be complemented by capacity-building initiatives for rural and marginalized providers. Without such parallel efforts, digital transformation risks exacerbating inequalities by advantaging well-resourced actors while further marginalizing peripheral communities (Gretzel et al., 2020; UNWTO, 2023).

Accessibility and inclusion strategies underperformed relative to other alternatives, highlighting a critical policy gap. Current approaches often treat accessibility as compliance obligation rather than fundamental design principle. Yet inclusive tourism represents both rights imperative and market opportunity, particularly given global demographic shifts including aging populations and travelers with disabilities. Though Petra has earned international accessibility recognition, this success requires scaling through national frameworks featuring standardized audits, minimum requirements, financial incentives, and awareness campaigns. True inclusion must additionally address barriers facing women, youth, refugees, and rural populations (Darcy & Buhalis, 2011; World Bank, 2024).

Environmental sustainability strategies presented implementation complexities despite scoring well on long-term value. Jordan's diverse natural heritage encompassing deserts, mountains, and coastlines demands conservation alongside tourism development. While exemplary cases like Feynan Eco-Lodge exist, they remain exceptional rather than normative. National initiatives including green certifications and renewable energy integration show promise but suffer from inconsistent application. The sector consequently needs actionable roadmaps with measurable targets, SME-adapted certification pathways, and enhanced public-private partnerships (Gössling & Hall, 2019; Higgins-Desbiolles, 2006).

Critically, optimization necessitates reconceptualizing heritage tourism as a system-wide challenge rather than isolated interventions. Jordan's historical emphasis on physical upgrades and promotional campaigns remains insufficient for contemporary global markets. The Multi-Criteria Decision Analysis demonstrates that effective optimization demands coordinated cross-ministerial action balancing short-term economics with long-term resilience, weighing economic outputs against cultural meaning, and integrating global trends with local realities.

Methodologically, this study confirms Multi-Criteria Decision Analysis's value in tourism planning through transparent criteria weighting and alternative scoring. By exposing fundamental value trade-offs, the framework provides structured dialogue platforms for diverse stakeholders government planners, private operators, community leaders, and conservation advocates to test scenarios, clarify priorities, and build evidence-based consensus amid competing interests (Belton & Stewart, 2002; Kiker et al., 2005).

8. Conclusion

This research delivers a comprehensive optimization framework for Jordan's heritage tourism through systematic Multi-Criteria Decision Analysis, elucidating strategic alignment between global paradigms and local imperatives. The methodology renders visible the multidimensional trade-offs inherent in tourism planning, demonstrating conclusively that no singular strategy achieves equitable outcomes across all objectives. This necessitates coordinated, balanced approaches acknowledging complex interactions among economic, cultural, sociocultural, environmental, and technological domains.

Findings foreground community-driven and experiential models as transformative vectors for redefining success beyond visitor volume metrics. These approaches center local identity, cultural resilience, and equitable benefit distribution, thereby actualizing global shifts toward authenticity and regenerative sustainability. Concomitantly, they demand complementary investments in three critical enablers: digital literacy infrastructure for marginalized operators, environmental certification protocols, and universal accessibility frameworks. Such synergies ensure tourism's benefits permeate all demographic strata while mitigating spatial inequalities.

Methodologically, the study validates Multi-Criteria Decision Analysis as an indispensable decision-support architecture. By transparently quantifying priority weightings and alternative performance, the model establishes an evidence-based deliberative platform for reconciling stakeholder conflicts. Realizing Jordan's heritage optimization potential consequently requires tetrahedral commitment: robust technical frameworks, sustained political will, institutional polycentric governance, and longitudinal capital allocation. Only through this integrated foundation can strategic visions translate into enduring, system-wide socioeconomic impact.

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