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Analysis of Digital Transformation Indicators (2020–2025) and Their Strategic Implications for Modernizing Tourism Infrastructure in Algeria

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Abstract:

This study analyzes the trajectory of digital transformation indicators in Algeria (2020–2025) to assess their impact on the development of the tourism sector's digital infrastructure. Adopting a descriptive-analytical approach, the research examines key national and international indicators—including internet penetration, network quality, online booking systems, e-payment ecosystems, and digital tourism services—leveraging data from official bodies and international organizations such as UNCTAD, ITU, and the WTTC.

The empirical analysis indicates a dichotomy in performance: while foundational digital infrastructure (connectivity and mobile density) has achieved maturity, the tourism-specific digital ecosystem remains fragmented. Critical bottlenecks were identified, including low interoperability between payment gateways and hospitality management systems, and a deficit in data-driven destination marketing. The study concludes that transitioning from 'digital presence' to 'digital competitiveness' requires a strategic pivot towards service integration rather than mere infrastructural expansion.

Keywords *: Digital transformation, Tourism sector, Algeria, Digital infrastructure*

Jel Classification *: L83, O33, Z32, D83*

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1. INTRODUCTION:

Tourism stands as a vital service sector for sustainable development and economic diversification, acting as a primary conduit for foreign currency generation, job creation, and the stimulation of both domestic and foreign investment. Amid the rapid evolution of Information and Communication Technologies (ICT) and the global proliferation of artificial intelligence, digitalization has emerged as a cornerstone for modernizing the tourism industry and bolstering its competitiveness. This transformation is realized by enhancing service quality, streamlining marketing efforts, and enriching the tourist experience through interactive digital media, driven by growing demand for seamless digital solutions—from online booking platforms to smart destination management and integrated e-payment systems.

Algeria has not remained isolated from these global shifts, recognizing the strategic imperative of digital transformation within its broader economic policies. The country has launched initiatives to digitize public services and develop electronic portals for tourism and investment, aligning with global digital economy trends. In this context, examining Algeria's digital tourism infrastructure holds significant scientific and practical value. It allows for a critical diagnosis of the current landscape to identify strengths, weaknesses, and the structural challenges impeding an effective digital transition.

Today, digital infrastructure is foundational to enabling the tourism experience, optimizing promotion, and measuring environmental and social impacts. While the National Strategy (SNTN-2030) addresses broad ICT goals, a critical gap remains in operationalizing these macro-policies within the micro-context of the tourism value chain. Unlike other sectors (e.g., banking), tourism requires a high degree of real-time integration between diverse stakeholders (hotels, transport, sites). This study specifically investigates this 'implementation gap'. Unlike other sectors (e.g., banking), tourism requires a high degree of real-time integration between diverse stakeholders (hotels, transport, sites). This study specifically investigates this 'implementation gap' to understand why macro-policies have not fully translated into micro-level tourism competitiveness.

Despite progress, Algeria’s current digital infrastructure continues to face hurdles regarding technical coverage, service quality, and human resource readiness, limiting the tourism sector's ability to fully leverage digital opportunities. Consequently, this study aims to analyze these indicators to anticipate strategic pathways for building an integrated digital infrastructure that supports a competitive, sustainable tourism sector and elevates Algeria’s status as a global destination.

- **Research Problem:**

Despite Algeria's accelerated efforts to upgrade its national digital infrastructure and integrate ICTs across various economic sectors, the spillover effect on the tourism industry remains suboptimal. The sector continues to experience a sluggish pace of digital adoption, creating a disconnect between the available infrastructure capabilities and their actual utilization in tourism services. This lag limits Algeria's ability to meet the demands of the modern digital traveler and undermines the competitiveness of its destination marketing.

Accordingly, the research problem addresses the following core question: To what extent do current digital transformation indicators (2020–2025) reflect the readiness of Algeria's tourism infrastructure, and what are the strategic implications of these indicators for modernizing the sector?

To operationalize the research problem and dissect the specific dimensions of digital infrastructure deficiencies, the following sub-questions are proposed:

- To what extent is the basic digital infrastructure available in Algeria sufficient to support the digital transformation process within the tourism sector?
- How can the key digital connectivity indicators in Algeria—such as internet penetration, network quality, and mobile coverage—be characterized during the study period?
- How do the broader digital transformation indicators in Algeria reflect on the establishment of an effective digital infrastructure specifically for the tourism sector?
- What are the primary challenges and barriers hindering the achievement of an effective and sustainable digital transformation in Algeria's tourism sector?

- **Research Topic Significance:**

The significance of this study is derived from several key dimensions:

- Strategic Role of Infrastructure: It underscores the pivotal role of digital infrastructure as a primary driver for attracting modern tourists and enhancing the international competitiveness of Algeria as a destination.
- Data Contribution: It provides an up-to-date analysis of digital indicators (2020–2025), offering a valuable database that can be utilized in future research concerning tourism technology and smart destination management in Algeria.
- Diagnostic Value: It enables a critical understanding of the specific digital weaknesses and structural gaps that impede the modernization and advancement of tourism services.
- Practical Implications: It moves beyond diagnosis to propose practical solutions and recommendations aimed at addressing the challenges hindering the development of a suitable infrastructure for Algeria's tourism sector.

- **Research Objectives:**

This study aims to achieve the following objectives:

- Analyze the current state of digital infrastructure within Algeria's tourism sector and identify the structural challenges hindering its effective digitization.
- Assess the performance of key digital infrastructure indicators in Algeria, including internet penetration, network quality, coverage, and the prevalence of smart devices.
- Evaluate the maturity level of digital tourism services, specifically focusing on online booking systems, digital promotion, smart guidance, and electronic payment solutions.
- Formulate a set of practical recommendations aimed at upgrading and strengthening the digital infrastructure to support a competitive tourism sector in Algeria.

2. Conceptual Framework of Digital Infrastructure in the Tourism Sector:

Digital infrastructure in the tourism sector represents an integrated ecosystem of technologies and products designed to enable the secure collection, transmission, and storage

of data across information systems. It plays a crucial role in coordinating the efforts of service providers across various sub-sectors, including transportation, hospitality, and entertainment.

At its core, this infrastructure encompasses essential components such as Global Distribution Systems (GDS)—exemplified by platforms like Galileo and Amadeus. These systems facilitate efficient logistical flows, significantly reduce transaction costs, and enhance overall service quality, thereby meeting the evolving needs of both consumers and regulatory bodies within the industry (Vasilenko, Lavrova, & Tokareva, 2019).

2.1. Components of Digital Infrastructure in the Tourism Sector:

The digital infrastructure of the tourism sector encompasses a comprehensive set of technical, organizational, and service-oriented elements that form the bedrock of digital transformation. Key components include:

2.1.1. Communication Networks and Internet Connectivity: High-speed internet is paramount for supporting modern travel trends such as digital nomadism and remote work, bolstering tourism economies in both urban and rural areas by ensuring seamless access to information and communication (Mitra & Paul, 2025). This component highlights how national broadband policies can drive digital adoption in tourism establishments. Furthermore, advanced technologies like the Internet of Things (IoT) and Artificial Intelligence (AI) leverage this connectivity to manage tourist attractions efficiently, providing real-time data and actionable insights (Rudenko, 2025).

2.1.2. Digital Platforms and Ecosystems: Digital platforms are integral to tourism logistics, facilitating coordination among tour operators, service providers, and tourists to create a supportive digital environment (Baggio & Del Chiappa, 2013). Online booking systems and travel applications streamline service delivery and deepen customer engagement (Toshmurzayevna, 2024). Moreover, developing integrated digital ecosystems fosters innovation in tourism and hospitality products, enhancing consumer value. This paves the way for "Smart Destinations," where core processes are digitized to elevate the visitor experience through technology.

2.1.3. Technological Infrastructure and Human Capital: The synergy between physical technological infrastructure and the digital proficiency of the workforce is a critical determinant of successful digitization. State policies and training programs play a vital role in developing these competencies, thereby driving economic development through a digitally capable tourism workforce (Toshmurzayevna, 2024).

2.1.4. E-Payment Solutions and Tourism Information Systems: Electronic payment systems are essential for a frictionless user experience, enabling secure and instant online reservations (Gupta et al., 2024). These systems bolster consumer confidence in digital transactions. Concurrently, Tourism Information Systems (TIS) provide indispensable data on destinations and accommodations for trip planning (Sanju, 2023). Crucially, the feedback loops within these systems allow for the sharing of post-trip experiences, influencing future travelers and driving service improvements (Ramos, 2010).

2.2. Importance of Digital Infrastructure for the Tourism Sector:

Digital infrastructure plays a pivotal role in the tourism ecosystem by streamlining service delivery, maximizing visitor satisfaction, and driving economic growth. This importance is realized through several key mechanisms:

2.2.1. Enhancing the Tourist Experience via Digital Services: It provides the necessary tools and applications—such as booking engines, price comparison platforms, and real-time information systems—that empower tourists to seamlessly plan their trips. This accessibility significantly elevates the overall quality of the tourism experience (Buhalis & Amaranggana, 2013, pp. 557-558).

2.2.2. Bolstering International Competitiveness: Destinations equipped with advanced digital infrastructure gain superior global visibility through search engines and digital aggregators. This technological edge enhances their competitiveness relative to destinations with lower digital maturity (Gretzel, Sigala, Xiang, & Koo, 2015, pp. 180-181).

2.2.3. Optimizing Operational Efficiency: Integrated systems for information management, e-bookings, and digital payments allow tourism establishments to automate processes. This automation reduces operational costs and optimizes the allocation of both human and logistical resources.

2.2.4. Facilitating Data-Driven Decision Making: By enabling the collection and analysis of big data, digital infrastructure allows governments and businesses to forecast demand accurately. This data-driven approach aids in formulating precise policies and tailoring services to meet evolving tourist expectations.

2.2.5. Amplifying Destination Marketing: Robust infrastructure empowers stakeholders to leverage high-bandwidth digital channels—including social media, influencer campaigns, and Virtual Reality (VR) tours. These tools effectively enhance destination attractiveness and positively influence travel intentions.

2.2.6. Enabling Smart Tourism Ecosystems: It serves as the backbone for "Smart Tourism," which integrates the Internet of Things (IoT), Artificial Intelligence (AI), and Augmented Reality (AR) to create immersive and interactive experiences for visitors.

2.2.7. Promoting Tourism Sustainability: Digital tools facilitate the monitoring of tourist flows and the management of environmentally sensitive sites. By optimizing smart transportation and guiding visitors toward sustainable choices, digital infrastructure helps reduce the environmental footprint of tourism activities (UNWTO, 2022).

3. The Reality of Digital Transformation in Algeria (2020–2025):

Before examining the specific nuances of digital tourism infrastructure, it is imperative to first assess the broader landscape of Algeria's digital orientation through key national indicators. The year 2020 marks a structural turning point in this trajectory, characterized by the establishment of the Ministry of Digitization and Statistics. This institutional milestone signaled the elevation of digitalization to a strategic state priority, facilitating the

consolidation of sectoral efforts under centralized oversight (HCN, 2024, p. 20). Accordingly, 2020 serves as the baseline year for analyzing the evolution of digital transformation indicators in Algeria, as detailed in the following sections.

3.1. Indicators of Internet Usage, Mobile Telephony, Social Media, and Fixed Broadband:

This section analyzes four critical dimensions of digital adoption:

3.1.1. Internet Usage: Reflects the degree of digital inclusion and the population's capacity to access and leverage electronic services.

3.1.2. Mobile Telephony: Measures the penetration of mobile services within society, serving as the primary gateway for accessing the digital ecosystem.

3.1.3. Social Media Adoption: Quantifies the active population on platforms such as Facebook, Instagram, and TikTok. This metric encompasses active account numbers, engagement rates, daily usage patterns, and annual growth trajectories.

3.1.4. Fixed Broadband: Indicates the prevalence of high-speed wired internet connectivity. This infrastructure is a prerequisite for deploying bandwidth-intensive digital services, particularly within institutional and enterprise environments.

Table 01: Indicators of Internet Usage, Telephony, Social Media, and Fixed Broadband (2020–2025)

Years	Internet Users (%)	Internet Users (Million)	Social Media Users (Million)	Fixed Broadband (per 100 inhabitants)	Mobile Subscriptions (Million Lines)	Mobile Subscriptions (per 100 inhabitants)
2020	60.7%	~26.5	~22	~10	~44	~103
2021	66.2%	~29.5	~22.5	~11	~46	~105
2022	~71%	~31	~23.5	~11.5	~50	~109
2023	70.9%	32.1	23.95	12.0	~51	~109.5
2024	~74%	~34.8	~24.8	~12.5	~53	110.2
2025	~76–77%	~36.2	~25.5	~12.8	~55	~111

Source: Compiled by the authors based on data from ITU (2023), ARPCE (2024), World Bank (2025), and Kemp (Digital 2023/2024 Algeria).

The data presented in Table 01 reveals a substantial rise in internet penetration, climbing from approximately 60.7% in 2020 to an estimated range of 76–77% by 2025. This upward

trajectory reflects the expansion of digital infrastructure and improved access to network services, underscoring the catalytic role of the post-COVID-19 era, which generated urgent demand for connectivity in education, administration, and commerce. However, the growth rate exhibited temporal variations: a marked surge was observed between 2020 and 2022, followed by a period of relative deceleration from 2023 to 2025. This slowdown signals Algeria's entry into a phase of partial market saturation, necessitating a strategic pivot from merely expanding coverage to prioritizing service quality and bandwidth stability.

In absolute terms, the number of internet users grew from 26.5 million in 2020 to over 36 million in 2025. This expansion aligns with penetration trends and is driven primarily by a youthful demographic and the ubiquity of smartphones as the primary access point. Such accelerated digital dynamics provide a fertile foundation for the development of e-commerce, local digital content, and e-government services.

- **Mobile Telephony Saturation:** Turning to mobile connectivity, subscription rates consistently exceeded 100 per 100 inhabitants throughout the period, surpassing 110 by 2024–2025. This figure—indicating that active lines outnumber the population—typifies markets with intensive multi-purpose usage (e.g., separate lines for personal, professional, and data use). The saturation of mobile subscriptions (>110%) suggests a structural shift from an 'acquisition phase' to a 'retention and value-creation phase'. For tourism stakeholders, this implies that the primary channel for customer engagement is no longer the physical agency but the mobile interface, necessitating a 'Mobile-First' strategy in destination marketing strategies.

- **The Fixed Broadband Gap:** In contrast to the mobile boom, fixed broadband subscriptions remained relatively low, edging up from 10 to only 12.8 per 100 inhabitants. This stagnation highlights the dominance of mobile internet in the national landscape and the limited penetration of fiber optics in households. The significant disparity between rapid mobile growth and sluggish fixed broadband expansion points to a structural shortfall. This gap poses a risk to the development of a data-intensive digital economy, potentially impeding sectors that rely on high-bandwidth stability, such as high-quality remote learning, enterprise cloud services, and content streaming. Consequently, accelerating the deployment of fixed infrastructure remains a key strategic imperative for Algeria.

- **Social Media Dynamics:** Finally, the number of social media users rose from approximately 22 million in 2020 to over 25.5 million in 2025. This increase signifies a profound societal shift toward new patterns of digital communication and consumption. Although positive, the growth rate trails the overall expansion of internet users, suggesting a level of platform saturation and a competitive shift toward content quality and user-centric services. Nevertheless, this indicator underscores the pervasive influence of social networks on public opinion and social commerce, compelling both government and private institutions to adopt more sophisticated digital communication strategies.

3.2. E-Government Indicators:

The United Nations publishes the E-Government Development Index (EGDI) on a biennial basis. This periodicity reflects the comprehensive nature of the index, which entails the collection of over 100 global indicators, the rigorous analysis of thousands of government portals, and the evaluation of national infrastructure and human capital across 193-member states. Consequently, this study focuses on the evolution of the EGDI in Algeria during the available reporting period of 2020–2024, as detailed in Table 02.

Table 02: **E-Government Development Index and Electronic Participation Index in Algeria (2020–2024)**

Years	EGDI Value	Rank out of 193 Countries	EPI Value	Rank out of 193 Countries
2020	0.5173	120	0.15480	183
2022	0.5611	112	0.22730	148
2024	0.5956	116	0.05480	187

Source: United Nations E-Government Survey (2020, 2022, 2024). Compiled by the authors

- The E-Government Development Index (EGDI): The data in Table 02 illustrates a consistent upward trajectory in Algeria's EGDI score, which rose from 0.5173 in 2020 to 0.5956 in 2024. This quantitative improvement signifies notable progress in the digitization of public administration, driven by the rollout of key services such as electronic permitting, online commercial registries, and integrated e-payment systems, alongside broader enhancements in 4G communication infrastructure. However, this absolute progress contrasts with Algeria's relative global standing. While the ranking improved initially from 120th to 112th between 2020 and 2022, it subsequently declined to 116th in 2024. This fluctuation reveals a competitiveness gap: although Algeria is advancing, peer nations are digitizing at a faster velocity. Consequently, digital transformation in Algeria appears to be incremental and structural rather than comprehensive, posing a challenge to its international digital competitiveness.

- The Electronic Participation Index (EPI): The trajectory of the EPI presents a more complex picture. A promising improvement was observed between 2020 and 2022 (rising to 0.2273), reflecting increased transparency through official platforms and incipient mechanisms for citizen engagement, likely via interactive ministerial websites. Conversely, the index suffered a precipitous decline in 2024, dropping sharply to 0.0548. This regression points to a critical deficiency in genuine digital participation. It suggests that digitization efforts have been disproportionately focused on administrative efficiency (e.g., bureaucracy

reduction) rather than fostering open government data or enabling citizen involvement in decision-making. This severe fluctuation highlights a profound disconnect between administrative digitization and participatory governance, positioning Algeria among the lower-performing nations globally in this specific domain.

3.3. E-Commerce and Digital Payments Landscape:

Analyzing the indicators for e-commerce and digital payments in Algeria presents a challenge due to the sporadic nature of available data. Unlike telecommunications metrics, comprehensive annual statistics for financial digitization are not consistently published; key sources such as the World Bank's Global Findex release reports triennially rather than annually. Consequently, this section does not present a continuous time series but instead synthesizes available data points to construct a representative overview of the sector's trajectory during the study period.

3.3.1. E-Commerce Readiness Assessment (eT Ready):

Algeria's e-commerce landscape has witnessed rapid expansion, particularly within the services sector, catalyzed by broader ICT proliferation and enhanced internet accessibility. Notably, the number of registered e-commerce entities has grown at an impressive average annual rate of 92% since 2020. Concurrently, the volume of online payment transactions for goods and services tripled between 2020 and 2024. Despite these robust indicators, the sector remains largely domestic-centric, with payments for physical goods representing only a fraction of total transactions.

- The Gap Between Potential and Performance: According to UNCTAD estimates, Business-to-Consumer (B2C) e-commerce sales accounted for a mere 0.8% of Algeria's GDP in 2023 (UNCTAD, 2025). This figure stands in stark contrast to global benchmarks, where B2C sales averaged approximately 2.3% of global GDP in 2020, rising to 2.5% by 2021. This disparity reveals a limited integration of e-commerce into the broader national economy and underscores a persistent weakness in online consumer demand. Key inhibitors include deficits in consumer trust, logistical bottlenecks, and the delayed maturity of financial digitization.

- Strategic Implications: This data highlights a profound dichotomy: while Algeria exhibits significant improvements in digital readiness (infrastructure and registration), actual market transformation remains sluggish. The country possesses substantial unrealized potential but suffers from limited economic exploitation of these digital opportunities. To bridge this gap, UNCTAD (2025) emphasizes the urgent need for a comprehensive national e-commerce strategy. Such a framework is essential to clarify the vision, enhance institutional coordination, and lay the regulatory groundwork for a dynamic, competitive e-commerce ecosystem that can bridge the divide between digital readiness and behavioral adoption.

3.3.2. Analysis of Digital Payments Evolution:

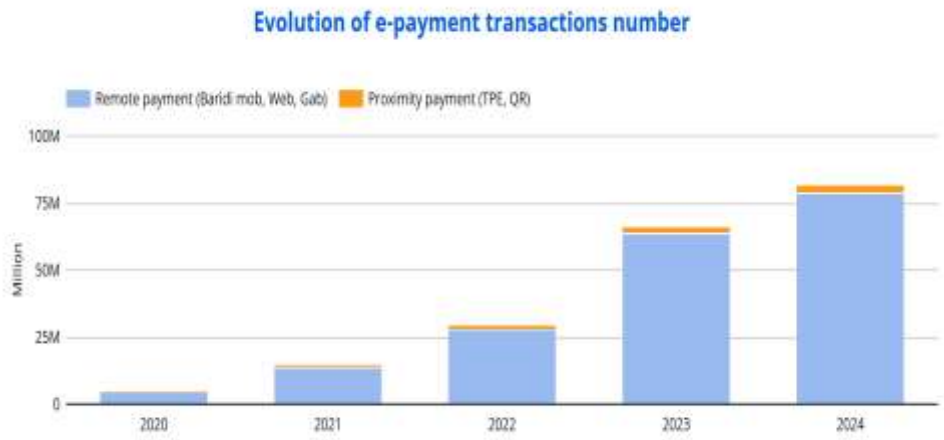
The landscape of digital payments in Algeria has undergone a significant transformation. Between 2020 and 2024, the volume of online transactions for goods and services tripled, paralleling the explosive 92% annual growth rate of registered e-commerce entities. This surge is fundamentally underpinned by improvements in internet connectivity and the broader

expansion of digital infrastructure. Despite the surge in e-payment infrastructure (Edahabia cards), a 'Cash-Preference Paradox' persists. This behavioral resistance creates a friction point in the tourist journey, where the inability to use seamless digital payments at local touchpoints (museums, local transport) diminishes the overall visitor experience and limits revenue capture efficiency (UNCTAD, 2025, pp. 25–35). This preference is attributed to the historical dominance of cash-based transactions, lingering trust deficits in e-payment systems, and the relatively slow initial uptake of mobile banking applications during the early stages of Algeria's digital transition.

- Expansion of Payment Infrastructure: A key driver of this evolution is the proliferation of the "Edahabia" (Gold) debit cards issued by Algeria Post. The number of circulating cards more than doubled, rising from 6 million in early 2020 to over 14.3 million by the end of 2024 (MPT, 2025). This metric serves as a proxy for the broader expansion of the financial ecosystem, including increased POS terminal density and a higher volume of online financial settlements.

- Exponential Transaction Growth: While granular annual data remains sparse, the overall trajectory points to exponential growth. The year 2024, in particular, marked an inflection point, witnessing a 57% surge in electronic transaction values during the first half alone, reaching approximately 60 billion DZD. This robust performance is driven by a convergence of factors: the upgrade of banking platforms and electronic gateways, the proliferation of online payment portals, the entry of new service-oriented e-commerce players, and a lasting shift in consumer behavior post-COVID-19. This evolution is visualized in Figure 01.

Figure 01: Evolution of Electronic Payments in Algeria (2020–2024)



Source: MPT, 2025

4. Diagnostic Analysis of Tourism Digital Infrastructure in Algeria:

This section provides a diagnostic assessment of the development and effectiveness of Algeria's tourism digital infrastructure. Utilizing a combination of quantitative and qualitative indicators, the analysis evaluates the current maturity level of key infrastructure components. Given the nascent stage of sectoral data collection, this assessment adopts a pragmatic

approach, synthesizing the most relevant available data to construct a representative profile of the sector's digital readiness.

4. Analysis of the Tourism Digital Infrastructure in Algeria: A Diagnostic Assessment:

This section diagnoses the developmental status and effectiveness of Algeria's tourism digital infrastructure through a focused analysis of key quantitative and qualitative indicators. While the comprehensive dataset for tourism-specific digital metrics remains developing, this assessment leverages the most robust available data to diagnose the performance of critical infrastructure components. The analysis aims to bridge the gap between general digital transformation metrics and their specific implications for the tourism sector.

4.1. Indicators for Measuring Digital Infrastructure in the Tourism Sector:

These indicators are diverse, as shown in the following table:

4.1. Framework for Measuring Digital Tourism Infrastructure:

To comprehensively assess the digital readiness of the tourism sector, a multidimensional framework of indicators is employed. These metrics cover connectivity, service digitization, smart transformation, and the digital economy ecosystem. The key indicators utilized in this diagnostic framework are detailed in Table 03.

Table 03: Digital Infrastructure Indicators for the Tourism Sector

Indicator	Components
Connectivity Indicator	-Internet coverage ratio (Fixed & Mobile Broadband). - Internet speed and quality (Latency, Fiber Penetration). - Smartphone penetration rate. - 4G/5G network coverage. - Affordability Index (Internet cost relative to income).
Digital Tourism Services	- Ratio of online tourism bookings. - Digitization level of travel agencies and hotels. - Adoption of CRM and ERP systems in tourism establishments. - Existence of official national tourism platforms. - Availability of maps and digital services in tourist destinations.
Smart Tourism Transformation	- Deployment of IoT technologies in tourist sites. - Use of Big Data analytics in demand management. - Integration of AI recommendation engines. - Adoption of VR/AR in tourism promotion.

Digital Tourism Economy	- Open data infrastructure environment. - Ratio of digital tourism transactions to total spending. - Adoption of e-payment solutions (Penetration rate). - Size of online travel market.
Cybersecurity & Data Protection	- National cybersecurity readiness index. - Traveler data protection measures (GDPR Compliance or equivalent). - User trust in electronic payments and digital services
Human Capital & Skills	- Ratio of employees receiving digital training. - Number of annual training courses in tourism digitization. - Percentage of institutions employing IT specialists.
Regulatory Framework	- Number of laws regulating digital transactions. - Degree of regulatory compliance by tourism institutions. - Application of international standards in digital services.

Source: GSMA, 2025; ITU, 2025

4.2. Analysis of Available Indicators for Algeria's Tourism Digital Infrastructure:

Given the nascent stage of digital transformation in Algeria, granular statistics specifically dedicated to tourism digital infrastructure remain scarce. To address this data gap, this analysis adopts a proxy-based approach, compiling and examining the most relevant indicators derived from the latest official sources. While the majority of these metrics are general in nature (macro-digital indicators), they are fundamentally critical to the analysis. The rationale is that the viability of digital tourism is inextricably linked to, and dependent upon, the robustness of the broader national digital infrastructure.

4.2.1. Connectivity Indicator:

Some available data exist regarding sub-indicators that reflect Algeria's overall connectivity index, as follows:

4.2.1.1. Analysis of the GSMA Mobile Connectivity Index:

The Mobile Connectivity Index assesses the prevalence and quality of mobile services within society. This metric is particularly salient for the tourism sector, as mobile connectivity forms the foundational layer for accessing essential digital services—ranging from real-time navigation and maps to online booking platforms and smart travel applications.

To ensure consistency and comparability, all indicator values presented in this analysis have been standardized to a 0–100 scale, where higher scores denote superior performance. Data processing, including the imputation of missing values and normalization, was conducted exclusively by GSMA Intelligence to maintain statistical integrity.

Figure 02: GSMA Mobile Connectivity Index in Algeria (2024)



Source: GSMA, 2025.

The data illustrated in Figure 02 indicates that Algeria's overall connectivity score stands at a moderate 57.9 out of 100, placing the country at an intermediate stage of digital maturity. However, a deeper analysis reveals significant disparities across the four key dimensions:

➢ **Infrastructure and Readiness (Strengths):**

- Consumer Readiness (73.2): This dimension ranks highest, representing a robust competitive advantage. It signifies a high level of preparedness among Algerian users—including potential tourists—to adopt digital platforms. This readiness is driven by strong mobile ownership, basic digital literacy, and a growing appetite for online interaction.

- Infrastructure (63.5): The core infrastructure score demonstrates that Algeria possesses a relatively sound technical foundation. Recent investments have established decent network coverage and signal quality, positioning the physical connectivity layer as "moderate to good."

➢ **Affordability and Content (Weaknesses):**

- Affordability (49.6): Falling below the global average, this score highlights persistent economic barriers. The cost of mobile data and devices remains high relative to income levels, potentially limiting universal access and requiring targeted policy interventions to improve price accessibility.

- Content and Services (48.7): This is the weakest dimension, revealing a critical gap in the digital ecosystem. It implies a scarcity of locally relevant content, limited availability of utilitarian mobile applications, and a lack of sophisticated digital platforms (including tourism-specific services).

➢ **Implications for the Tourism Sector:**

For tourism stakeholders, these indicators present a mixed landscape. The high consumer readiness is a strategic asset; the market is primed for the launch of digital tourism services, booking apps, and promotional campaigns. However, this potential is constrained by two structural bottlenecks: the weakness in content, which limits the richness of the digital tourist experience, and affordability issues, which may restrict internet access for budget-conscious travelers or in lower-income tourist areas. Consequently, the priority must shift from building networks (which is relatively advanced) to developing content and lowering access costs.

4.2.1.2. Internet Penetration, Speed, and Quality Metrics:

➢ **Penetration and Market Structure:** Recent reports indicate a steady upward trajectory in internet penetration, reaching approximately 72.9% in early 2024, up from 70.9% in 2023 (Algeria INVEST, 2024). The subscriber base continues to expand across both fixed and mobile segments. By the second quarter of 2025, fixed internet subscriptions exceeded 6.6 million. However, the market structure remains heavily skewed toward mobile connectivity, which accounted for 88.9% of total subscriptions in Q1 2025, compared to just 11.1% for fixed connections (ARPCE, 2025).

➢ **Speed and Quality Performance:** regarding network performance, the national average download speed for fixed internet stood at approximately 12.32 Mbps in 2024, while mobile internet averaged 21.36 Mbps. However, these averages mask significant regional disparities. In urban centers benefiting from Fiber-to-the-Home (FTTH) deployment and enhanced 4G networks, peak performance is notably higher. Projections for 2025 suggest that high-speed fixed connections can reach 59–65 Mbps (download) and 30–37.5 Mbps (upload), while optimized mobile 4G networks can deliver speeds around 30 Mbps (SPEED GEO, 2025).

➢ **Strategic Assessment for Tourism:** This performance profile constitutes the backbone of the tourism sector's digital ecosystem. The implications of these indicators are threefold:

- **Tourist Experience & Connectivity:** The current infrastructure is sufficient to enable tourists (local and international) to access essential digital services—such as real-time mapping, ride-hailing apps, and instant hotel bookings—with relative ease, particularly in urban areas covered by mobile 4G.

- **Operational Feasibility for Businesses:** The availability of faster internet (especially fiber) enhances the feasibility of digitizing tourism enterprises (hotels, travel agencies). It supports critical backend operations, including cloud-based property management systems (PMS), reliable e-payment processing, and cost-efficient communication channels.

- **Destination Marketing & Attractiveness:** High-quality connectivity is a prerequisite for modern destination marketing. It allows for the seamless streaming of

promotional videos, virtual tours, and user-generated content on social media, thereby significantly boosting the visual appeal and digital footprint of Algerian destinations.

4.2.2. Evaluation of Digital Tourism Services:

This indicator assesses the maturity and availability of digital service delivery within Algeria's tourism ecosystem. While official aggregate data quantifying the digitization level of tourism enterprises remains sparse, the sector is witnessing a proliferation of targeted initiatives. These efforts—ranging from private startups to government-backed platforms—are driving a gradual yet tangible digital integration, aimed at optimizing service delivery and overcoming persistent infrastructural constraints.

4.2.2.1. The Emergence of National Digital Tourism Platforms:

The Algerian tourism landscape is currently witnessing a dynamic wave of digitalization, characterized by the launch of several indigenous platforms designed to bridge the service gap. Notable examples include:

1. **Fennec Booking:** A Pioneer in Integrated Booking As a flagship initiative, "Fennec Booking" represents one of the first comprehensive Algerian electronic platforms dedicated to travel aggregation. It integrates hotel reservations, flight ticketing, and transportation services within a unified e-payment ecosystem.

The platform delivers a seamless user experience, providing access to a vast global inventory that includes over one million hotels, 950 airlines, and 25,000 transportation options across approximately 75,000 destinations worldwide (Abrous, 2025).

2. Sacoddo: Heritage-Centric Tourism: The "Sacoddo" platform adopts a unique value proposition by merging tourism services with the promotion of Algerian cultural heritage. It focuses on valorizing both tangible and intangible assets through curated accommodation and activity packages. Additionally, it features an interactive social media component designed to foster community engagement and showcase Algeria's diversity in eight languages.

3. Dz Trip: Domestic and International Solutions: Managed by the "Al-Assimia" agency, "Dz Trip" specializes in streamlining both domestic and outbound travel. The platform offers a suite of services including hotel bookings, transportation logistics, and excursion planning, all fully supported by integrated electronic payment gateways (Abrous, 2025).

4.2.2.2. Adoption of Online Booking Systems:

Reflecting the nascent stage of the sector's digital maturity, there are currently no official statistics quantifying the precise percentage of online tourism bookings in Algeria. However, the trajectory is clearly oriented toward integration. A pivotal development in this regard is the Ministry of Tourism's recent announcement regarding the imminent interconnection of Algerian hotels with international payment gateways. This strategic initiative aims to enable customers—particularly international tourists—to book and pay for accommodations securely and seamlessly online (Atoui, 2025). Once implemented, this

interoperability will represent a critical milestone in enhancing the sector's global digital accessibility.

4.2.3. Cybersecurity Maturity and Trust Ecosystems:

As the tourism sector accelerates its digital transformation, reliance on technology for transactions and data management becomes absolute. In this context, the National Cybersecurity Index serves as a critical barometer of the state's capacity to safeguard digital transactions, protect sensitive tourist data, and secure booking ecosystems. A robust cybersecurity posture is no longer merely a technical requirement but a strategic determinant of destination competitiveness. Modern tourists increasingly factor digital safety standards into their travel decisions, viewing them as indicators of a destination's overall infrastructural readiness. Conversely, a weak cybersecurity framework erodes tourist confidence and deters investment from global travel companies, thereby constraining the development of a "Smart and Secure" tourism sector.

Cybersecurity encompasses the comprehensive suite of measures, technologies, and policies designed to defend digital systems, networks, and services against attacks, breaches, or disruptions. Its relevance is amplified by the escalating frequency of global cyber threats, the deepening integration of AI, and the ubiquity of constant connectivity.

According to the framework established by the International Telecommunication Union (ITU), the Global Cybersecurity Index (GCI) assesses nations' dedication to cybersecurity through four key strategic pillars:

-Legal Framework: Encompasses legislation on cybercrime and data protection, ensuring a robust legal environment to safeguard digital transactions and tourist information.

-Technical Measures: Evaluates the implementation of technical safeguards, including standards and the operational readiness of Computer Emergency Response Teams (CERTs) to mitigate threats targeting digital platforms.

-Organizational Structures: Assesses the existence of national strategies and specialized institutions mandated to coordinate cybersecurity policies and implementation.

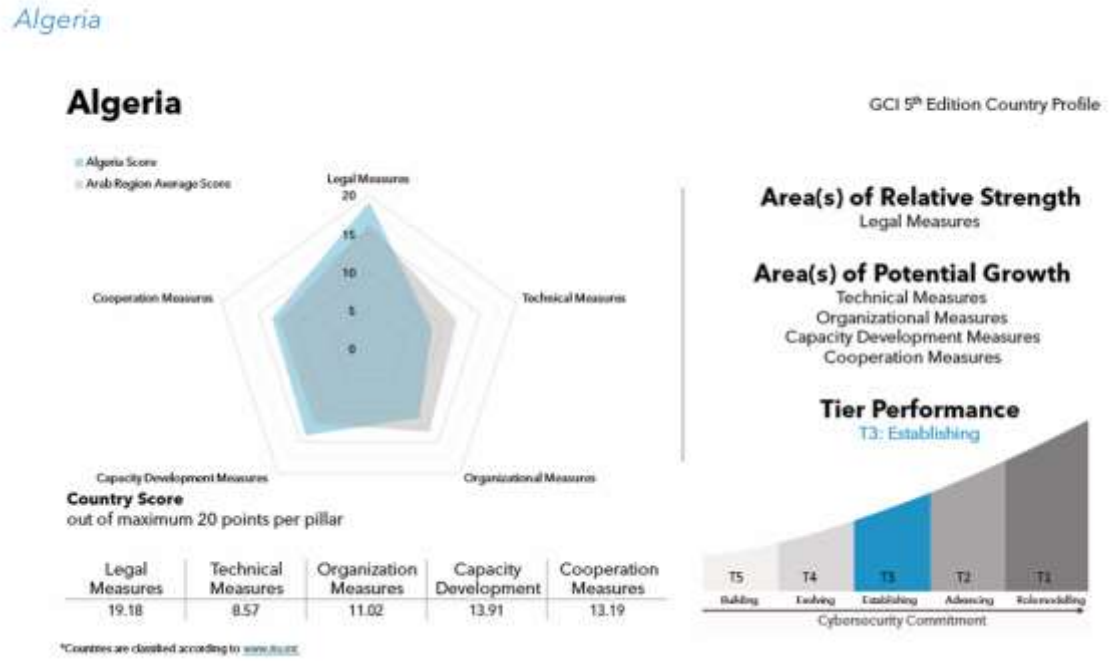
-Capacity Development: Focuses on building human expertise through training programs, educational curricula, and public awareness initiatives relevant to all sectors, including tourism.

-Cooperation Measures: This pillar assesses the existence of partnerships, cooperative frameworks, and information-sharing networks. It focuses on the implementation of bilateral and multilateral agreements, active participation in international forums, and the establishment of public-private partnerships to address cross-border cyber threats effectively.

In the 2024 edition of the GCI, Algeria is classified within the Intermediate Tier (Tier 3), achieving an overall score of approximately 58/100. While this score remains below the global average of 65.7/100, it reflects notable progress compared to previous assessments. This advancement is primarily driven by strengthened legislative frameworks and the

establishment of new organizational structures. However, the analysis highlights persistent bottlenecks in technical capabilities and human resource readiness, which continue to hinder full advancement.

Figure 03: Algeria's Cybersecurity Maturity Profile (2024) illustrates this positioning relative to global benchmarks.



Source: ITU, 2024, p. 71.

strategic pillars of the Global Cybersecurity Index, delineating clear strengths and critical vulnerabilities within the national commitment tiers.

1. Legal Measures (Strength): Algeria demonstrates exceptional performance in the legal domain, achieving a near-perfect score of 19.18/20. This represents the country's strongest asset, reflecting a robust legislative framework against cybercrime and the development of data protection laws that align closely with international standards.

2. Technical Measures (Critical Weakness): In stark contrast, the Technical Measures pillar records the lowest score at 8.57/20, falling significantly below the Arab regional average. This deficit highlights profound weaknesses in network security standards and digital infrastructure resilience. For the tourism sector, this is a critical vulnerability that must be addressed to ensure secure digital services.

3. Organizational Measures (Moderate): Scoring 11.02/20, organizational performance is classified as moderate. This score suggests that while preliminary national policies and structures exist, they remain either incomplete or inefficiently implemented. It also points to fragmented coordination among relevant government agencies.

4. Capacity Development (Developing): With a score of 13.91/20, efforts in capacity building are deemed acceptable. This reflects ongoing initiatives in university education and

basic training but underscores a lack of specialized cybersecurity research centers and advanced professional certification programs.

5. Cooperation Measures (Limited): Cooperation standards score 13.19/20, indicating a moderate level of engagement. This reflects limited regional and international collaboration and an absence of robust strategic partnerships with global cybersecurity organizations

The analysis reveals a structural imbalance in Algeria's cybersecurity ecosystem: a robust legal framework coexists with significant deficiencies across technical, organizational, and cooperative dimensions. This disparity firmly positions Algeria within the Foundational Stage (Tier 3). The limited maturity of technical capabilities, organizational structures, and human capital—when benchmarked against international standards—underscores the urgent need for reform. To transition from the current Foundational tier to the Advancing (Tier 2) and ultimately the Role-Modelling (Tier 1) tiers, Algeria requires a comprehensive, multidimensional strategy. This strategy must prioritize the upgrading of secure infrastructure, the enhancement of operational readiness, and the expansion of strategic international partnerships.

5. Strategic Challenges Facing Digital Tourism Infrastructure in Algeria:

Despite ongoing efforts, the Algerian tourism sector confronts multifaceted challenges that hinder full digital integration. These impediments can be categorized into four critical dimensions:

5.1. Infrastructure and Connectivity Gaps:

5.1.1. Digital Divide: Persistent disparities in fixed and mobile internet coverage between urban centers and rural/remote areas limit equitable access to tourism services and hinder the development of ecotourism in unconnected regions.

5.1.2. Payment Infrastructure: A structural deficiency in the electronic payment ecosystem, coupled with the technical unreadiness of hotels and travel agencies to process real-time digital transactions.

5.2. Operational and Technical Constraints:

5.2.1. Low Digital Maturity: A prevailing reliance on traditional, manual transaction methods within hotels and agencies, characterized by limited digitization of booking systems, customer relationship management (CRM), and payment gateways.

5.2.2. Cybersecurity Vulnerabilities: The sector's resilience is compromised by modest cybersecurity standards (GCI score of 58/100), posing risks to the integrity of digital tourism systems and user data.

5.2.3. Content Quality: The digital promotional content remains qualitatively inferior compared to regional competitors, exacerbated by a scarcity of open tourism data (Open Data) essential for third-party developers.

5.3. Human Capital and Cultural Barriers:

5.3.1. Skills Shortage: A critical lack of specialized human resources trained in digital marketing, smart tourism technologies, and data analytics.

5.3.2. Trust Deficit: Low user confidence in electronic transactions persists, alongside limited awareness among tourism stakeholders regarding the strategic imperative of digital marketing.

5.4. Regulatory and Institutional Hurdles:

5.4.1. Platform Fragmentation: The absence of unified, high-impact national platforms capable of driving effective tourism promotion on a global scale.

5.4.2. Regulatory Lag: The slow pace of updating legislation governing electronic bookings, e-commerce, and the specific protection of tourist data creates a regulatory gray zone that deters innovation.

6. Conclusion:

The longitudinal analysis of digital transformation indicators (2020–2025) demonstrates that Algeria has successfully laid the hardware of a digital economy—evidenced by robust connectivity and mobile saturation—but currently lags in the software of tourism integration. The empirical findings confirm that infrastructure availability alone is insufficient to drive destination competitiveness without a parallel modernization of regulatory frameworks and enterprise-level adoption. Consequently, the strategic imperative for the next phase is 'ecosystem interoperability'—ensuring that disparate digital silos (hotels, payment gateways, and booking platforms) can communicate seamlessly to create a unified tourist journey."

7. Recommendations:

Based on the diagnostic analysis of digital indicators, the following recommendations are proposed to accelerate the modernization of Algeria's tourism sector:

7.1. Infrastructure & Connectivity:

7.1.1. Targeted Deployment: Prioritize the deployment of high-speed connectivity (Fiber/5G) specifically in strategic tourist zones, including remote natural and historical sites, ensuring seamless access through smart Wi-Fi hotspots.

7.1.2. Accessibility & Affordability: Enhance digital inclusion by reducing internet costs in tourist areas and incentivizing ISPs to provide free connectivity in high-traffic zones to bridge the digital divide.

7.2. Platforms & Content Ecosystem:

7.2.1. Unified National Platform: Establish a centralized, high-performance national tourism platform under the Ministry of Tourism. This ecosystem must integrate accurate

destination data, real-time booking/payment engines, and verified user reviews to ensure a frictionless tourist journey.

7.2.2. Advanced Content Development: Invest in creating immersive digital content—including Virtual Reality (VR) tours, multilingual interactive guides, and Augmented Reality (AR) experiences—to showcase Algeria's heritage globally.

7.3. Smart Services & Digitization of Enterprises:

7.3.1. Smart Hotel Operations: Incentivize the adoption of smart hospitality solutions, such as digital check-in/out, mobile keys, and automated quality monitoring systems.

7.3.2. Agency Transformation: Support travel agencies in transitioning to digital business models by subsidizing the adoption of Customer Relationship Management (CRM) and Property Management Systems (PMS).

7.4. Financial Inclusion & Cybersecurity:

7.4.1. E-Payment Expansion: Mandate and facilitate the integration of electronic payment terminals (TPE/E-payment) across the entire tourism value chain (hotels, restaurants, transport).

7.4.2. Cyber Resilience: Implement rigorous cybersecurity standards and data protection protocols for all tourism platforms to rebuild digital trust and safeguard user privacy.

7.5. Innovation & Human Capital:

7.5.1. Innovation Labs: Launch "Tourism Innovation Labs" in partnership with universities and startups to foster local solutions for smart tourism challenges.

7.5.2. Capacity Building: Roll out comprehensive training programs for tourism operators on digital marketing and smart technologies, alongside awareness campaigns to promote digital adoption among local and international tourists.

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