

Scaling Telemedicine in Morocco: Policy Context, System Readiness, and Implementation Evidence.

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Abstract

Background: Telemedicine has emerged as a relevant lever for improving healthcare access in countries where geographic disparities, workforce shortages, and structural fragilities limit the delivery of in-person care. In Morocco, digital health initiatives expanded rapidly during the COVID-19 pandemic, creating both momentum and new pressures on a health system that was already navigating a complex modernization trajectory. While the urgency of the pandemic has passed, its effects on the adoption of remote care tools have proven more durable than initially anticipated, making it necessary to examine what has actually changed and what continues to hold progress back. **Methods:** This narrative review synthesizes Moroccan national policy documents, ministerial white papers, and peer-reviewed scientific literature published between 2017 and 2025 to analyze telemedicine development across three complementary dimensions: (1) the institutional and regulatory framework, (2) digital readiness and health information system interoperability, and (3) empirical evidence from clinical and public health implementations. The review was structured to capture both the enabling conditions and the structural barriers that shape telemedicine integration in the Moroccan context. **Results:** The review documents a growing level of institutional engagement with telemedicine, supported by national strategic documents and an expanding body of empirical research. Healthcare professionals generally hold positive attitudes toward teleconsultation, though practical continue to constrain effective adoption. Health information systems remain fragmented and poorly interoperable, directly undermining the continuity of care that telemedicine is expected to support. Evidence from specific domains, including chronic disease management, tuberculosis adherence, neonatal screening, and rehabilitation, confirms feasibility but also reveals important quality and equity gaps that have not yet been systematically addressed. **Conclusion:** Telemedicine in Morocco is moving beyond isolated pilots toward more deliberate integration within the national health system. However, this transition remains structurally constrained. Sustainable progress will require coherent governance mechanisms, investment in interoperable digital infrastructure, and comprehensive training strategies for healthcare professionals. Future research must move beyond feasibility assessments to rigorously evaluate quality of care, patient experience, and equity outcomes, in order to ensure that digital health tools contribute to reducing rather than reinforcing existing disparities.

Keywords: telemedicine; telehealth; digital health; teleconsultation; e-health; Morocco.

1. Introduction

Over the past decade, telemedicine in Morocco has undergone a significant transformation. What began as a set of isolated, often donor-funded pilot projects has gradually evolved into a more structured domain of health system policy. This shift did not happen in a vacuum. It reflects a convergence of long-standing structural pressures ; geographic inequalities in access to care, a concentration of qualified healthcare professionals in urban centres, and the systemic fragility exposed by the COVID-19 pandemic ; alongside a growing body of national and international evidence demonstrating the potential of digital health tools to support continuity of care (Rachid et al., 2024).

Morocco's health system faces persistent equity challenges. Large portions of the rural and peri-urban population remain underserved in terms of both specialist care and primary health services. Telemedicine represents, at least in principle, a means of partially bridging these gaps without requiring the same level of physical infrastructure that conventional care expansion demands. National strategic documents, including successive ministerial plans and the White Paper on e-Health, explicitly frame telemedicine as a lever for improving equity, quality, and efficiency within the healthcare system (*White-Paper-on-e-Health-in-Morocco*, n.d.)

Yet the distance between policy ambition and operational reality remains considerable. The White Paper itself acknowledges that, despite more than a decade of e-health initiatives, the national health information system is still fragmented, heterogeneous, and only partially accessible. This means that telemedicine is being deployed on top of a digital foundation that is not yet capable of fully supporting it. The challenge, therefore, is not simply to expand the number of teleconsultation platforms or remote care programmes, but to embed telemedicine within a coherent, interoperable, and governable digital ecosystem.

From a theoretical standpoint, analyzing telemedicine development in Morocco requires moving beyond descriptive accounts of individual projects. It calls for an integrated framework that simultaneously considers the regulatory environment, the readiness of digital infrastructure, and the evidence generated by clinical and public health implementations. These dimensions are not independent: regulatory frameworks determine what is legally possible and institutionally supported; digital infrastructure determines what is operationally feasible; and the experiences of clinicians and patients determine what is actually sustained over time (Le Pape et al., 2017; Park et al., 2021).

The theoretical anchoring of this review draws on two established frameworks. First, the health information system strengthening model developed by the World Health Organization, which situates information infrastructure as a foundational pillar of health system performance. Second, the technology acceptance model (TAM) and its health-specific extensions, which frame adoption as a function of perceived usefulness, perceived ease of use, and the organizational conditions that support or hinder uptake. Together, these frameworks allow for a structured analysis of why telemedicine succeeds or stalls in specific institutional contexts.

Against this background, this study addresses the development and scaling of telemedicine in Morocco as an emerging component of national health system transformation. The objective of this narrative review is to provide a structured and evidence-based analysis of telemedicine development through three complementary dimensions: (1) the institutional and regulatory framework, (2) digital readiness and health information system interoperability, and (3) empirical evidence from clinical and public health implementations. By integrating these dimensions, the study seeks to identify both the progress achieved and the structural constraints that continue to shape telemedicine adoption and long-term sustainability in the Moroccan healthcare context.

The remainder of this article is organized as follows. Section 2 examines policy orientation and organizational uptake of telemedicine in Morocco. Section 3 analyzes digital readiness, health information systems, and interoperability challenges. Section 4 synthesizes empirical evidence from telemedicine and digital health implementations. Section 5 discusses cross-cutting constraints and strategic priority directions for sustainable scale-up. Finally, Section 6 presents the main conclusions, theoretical implications, and practical recommendations.

2. Policy Orientation and Organizational Uptake

Morocco has directed growing institutional attention toward telemedicine, including regulatory and organizational efforts to establish remote care and expand access in underserved areas (Jallal, Serhier, et al., 2023). The White Paper places telemedicine within a broader e-health reform agenda tied to health-sector modernization, while acknowledging persistent gaps in coordination and digital capacity.

At the service level, Moroccan studies document organizational adaptation during COVID-19. Radiotherapy departments redesigned workflows to maintain treatment continuity and safety (Amaoui et al., 2020), while oncology centers implemented coordinated mitigation strategies

to protect vulnerable patients (Oualla et al., 2020). Although these crisis-driven responses were not telemedicine interventions as such, they accelerated digital coordination and normalized remote communication as part of routine care delivery.

The White Paper reports that a telemedicine partnership between the Ministry of Health and the Moroccan Society of Telemedicine is being extended to cover more than 120 remote localities, signaling a shift from pilot projects to territorial coverage (*White-Paper-on-e-Health-in-Morocco*, n.d.)

The institutional foundations for this territorial expansion rest on a structured legal architecture. Telemedicine in Morocco is formally governed by Law No. 131-13 related to the practice of medicine (Articles 99–102), which defines telemedical practice, establishes the modalities of collaboration with foreign practitioners, and specifies the ethical requirements governing the doctor-patient relationship in remote care contexts, including the mandatory documentation of patient consent (Jallal, Serhier, et al., 2023). Decree No. 2-18-378 of July 25, 2018, operationalized this legal basis by defining five recognized telemedical acts: teleconsultation, teleexpertise, telesurveillance, teleassistance, and medical response; and by establishing the authorization procedures, the institutions eligible to practice telemedicine, and the data protection obligations of practitioners. Following the COVID-19 pandemic, this decree was revised through Decree No. 2-20-675, adopted by the Council of Government on January 14, 2021, which updated the definition of teleconsultation, modified the composition of the telemedicine commission, and reinforced requirements around personal data protection in compliance with Law No. 09-08 (Jallal, Serhier, et al., 2023). A strategic diagnosis of the telemedicine ecosystem published by the Ministry of Health and Social Protection in 2022 acknowledged the persistence of significant regulatory and operational gaps, particularly regarding reimbursement modalities, pricing frameworks, the absence of a national catalog of certified platforms, and the delayed digitization of patient pathways (Ministry of Health, 2022)

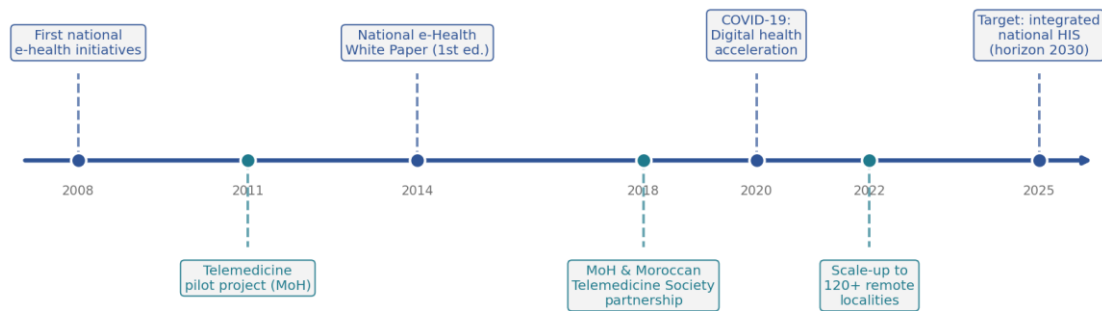
Figure 1 – Key milestones in Morocco's e-health and telemedicine policy trajectory (2008–2025)

Figure N°1: Key milestones in Morocco’s telemedicine and e-health policy trajectory (2008–2025)

Source: Compiled by authors from national policy documents and scientific literature

3. Digital Readiness: Health Information Systems and Interoperability

Beyond individual telemedicine pilots, national strategy documents identify interoperability as a prerequisite for coordinated care and secure data exchange. The White Paper argues that sharing health data across stakeholders is essential for continuity of care and patient follow-up, and recommends deployment of an interoperable national health information system and a shared electronic medical record as structural foundations for large-scale e-health implementation (*White-Paper-on-e-Health-in-Morocco*, n.d.).

Telemedicine scale-up stalls when clinical documentation, identity management, and data exchange remain fragmented. Moroccan informatics research repeatedly points to interoperability and system architecture as foundational requirements. A case study on developing a health management information system (HMIS) architecture in Morocco emphasizes the role of stakeholder engagement, local ownership, and capacity building in sustaining digital reform (Le Pape et al., 2017). Qualitative research on electronic health record (EHR) implementation in Moroccan university hospitals identifies siloed strategies, weak institutional bargaining power, repeated technical errors, limited interoperability standards, and missed collaboration opportunities; factors that directly undermine safe longitudinal telemedicine workflows (Parks et al., 2019).

Infrastructure gaps are evident at the hospital level. A cardiology department study reports perceived efficiency gains from digital and telemedicine-related tools, but identifies technical problems and training needs as major barriers, showing that readiness is both technological and human (Chafiq et al., 2025). Beyond hospitals, digital maternal and postnatal tools are emerging; evaluations of postnatal care applications reveal variability in functionality and highlight the need to improve adoption and visibility of locally developed solutions (Moumane et al., 2024).

Figure 2 — Conceptual framework: dimensions of digital readiness for telemedicine scale-up in Morocco

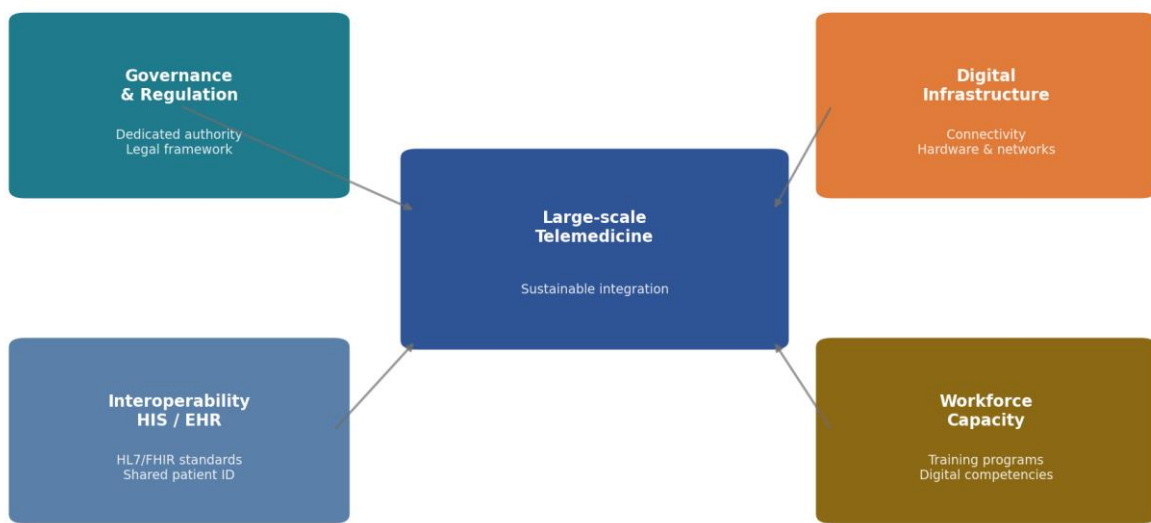


Figure N°2: Conceptual framework: dimensions of digital readiness for telemedicine scale-up in Morocco

Source: Adapted by authors from (Le Pape et al., 2017; Park et al., 2021; White-Paper-on-e-Health-in-Morocco, n.d.).

Table 2 synthesizes the principal barriers to interoperability identified in the Moroccan literature, along with the strategic recommendations drawn from national policy documents.

Barrier category	Key manifestations (literature)	Policy recommendation (White Paper)
Fragmented HIS	Siloed EHR deployments; no shared patient identifier	Deploy interoperable national HIS by 2030

Governance gaps	Weak coordination across ministries and institutions	Establish digital-health governance body with regulatory authority
Infrastructure	Connectivity deficits; hardware shortages in rural areas	Invest in broadband and equipment at peripheral facilities
Workforce capacity	Limited IT skills; insufficient digital training programs	Scale up digital health training; include curricula in health education
Interoperability standards	No uniform data standards adopted across facilities	Adopt HL7/FHIR standards for health data exchange

Table N°2: Barriers to digital readiness and corresponding policy recommendations

Source: Authors, based on (Le Pape et al., 2017; Park et al., 2021; White-Paper-on-e-Health-in-Morocco, n.d.).

4. Evidence From Telemedicine and Digital Health Implementations

4.1 Teleconsultation Acceptance and Provider Experience

Clinician acceptance is central to sustainable teleconsultation. In a survey at a Moroccan tertiary center, physicians showed high awareness and broadly agreed that teleconsultation would become part of routine clinical practice. At the same time, they reported practical obstacles: limited internet access, poor audiovisual quality, and communication difficulties with patients (Jallal, Berrada, et al., 2023). In oncology settings, specialists described mixed uptake during the pandemic, generally positive experiences explaining diagnoses remotely, and a moderate intention to continue teleconsultations after COVID-19, suggesting that sustainability depends on incentives, workflow compatibility, and patient readiness (Amaoui et al., 2020).

A quantitative study at Al Haouz Provincial Hospital found generally favorable professional attitudes toward teleconsultation, with respondents reporting moderate to high satisfaction. System quality, information quality, and service quality emerged as the main determinants; demographic characteristics were not statistically significant predictors. This suggests that platform-level attributes may matter more than individual characteristics in shaping professional acceptance (Emzi et al., 2024).

4.2 Chronic Disease Follow-Up: Feasibility With Quality Considerations

Telemedicine can support care continuity, though clinical equivalence with in-person follow-up is not assured. A comparative Moroccan study of diabetes management during Ramadan found similar rates of acute complications in telemedicine and conventional care groups, but less favorable glycemic control in the telemedicine cohort. The authors called for stricter monitoring protocols, better patient education, and hybrid models for high-risk patients (Motaib et al., 2021).

4.3 Public Health and Adherence: Mobile-Enabled Care Models

Moroccan evidence also supports digital tools for improving treatment adherence. A mobile-supported tuberculosis program reported higher treatment success rates and reduced loss to follow-up compared with baseline, showing how telehealth can reinforce community-based care in resource-limited settings (Park et al., 2021). More broadly, COVID-19 accelerated deployment of digital health solutions across testing, surveillance, telecare, laboratory information systems, and vaccination management, demonstrating the system's capacity to implement coordinated digital interventions when governance alignment is achieved (El Otmani Dehbi et al., 2021).

The tuberculosis evidence base in Morocco extends beyond the (Park et al., 2021) integrated management program. An earlier pilot study conducted in the city of Salé in collaboration with the Korea International Cooperation Agency (KOICA) introduced a medication event monitoring system equipping high-risk patients with a smart pillbox capable of detecting treatment interruptions. This project demonstrated a cost-effective approach to patient monitoring and inter-stakeholder coordination in a resource-limited setting (Park et al., 2019). Taken together, these two studies illustrate the progressive maturation of mobile-enabled public health interventions in Morocco, from small-scale monitoring devices to comprehensive patient management platforms, while underscoring the role of international partnerships in building local implementation capacity.

4.4 Screening, Rehabilitation, and Patient-Facing Tools

Morocco has generated evidence on technology-supported screening suited to connected-care models. A neonatal pilot confirmed the feasibility and clinical value of pulse-oximetry screening for critical congenital heart disease and recommended its integration into routine newborn care pathways (El Idrissi Slitine et al., 2020). In rehabilitation, studies report high

patient acceptance of serious-game interventions, including among individuals with limited digital literacy, suggesting that culturally adapted design and guided use can mitigate aspects of the digital divide (Bonnechère et al., 2017).

4.5 Patient Satisfaction and User-Centered Outcomes

Two additional domain-specific initiatives reported in the literature extend the scope of telemedicine applications in Morocco. In the field of maternal health, the Mobile Ultrasound Patrol project, conducted in collaboration with Qualcomm in three rural regions with elevated maternal mortality (Ribat El Khir, Oulmes, and Boulmane), equipped field workers with portable ultrasound devices and smartphones to transmit images to gynecologists in Casablanca, Fès, Meknès, and Paris. The intervention generated measurable gains in early detection of high-risk pregnancies, with time and cost efficiencies that did not compromise clinical quality, thereby reducing the likelihood of preventable maternal and child deaths (Nuber & Nordgren, 2014). In the field of neurology, the STROKOFES application, developed at the University Hospital of Fes, assists neurologist practitioners outside the hospital in stroke management decision-making by calculating medication dosages and generating standardized clinical data files transmissible to expert neurologists for remote consultation. The tool enables referring physicians to benefit from specialist expertise while preserving their clinical autonomy (Chaqda & Kissani, 2018). Both cases illustrate the potential of disease-specific, task-centered telemedicine tools to generate meaningful clinical value when deployment is grounded in clearly identified local needs.

4.5 Patient Satisfaction and User-Centered Outcomes

Moroccan research has recently begun examining patient-level outcomes of teleconsultation. A 2024 quantitative study on determinants of patient satisfaction reflects a wider national turn toward user-centered evaluation of digital health services. Satisfaction emerged as a multidimensional outcome shaped by perceived service quality, system performance, and interaction experience, reinforcing that telemedicine must be assessed not only for feasibility but also for perceived quality from the patient's perspective (Hantem et al., 2024).

Figure 3 — Evidence map: telemedicine implementation domains, study evidence, and reported barriers in Morocco (2017-2025)

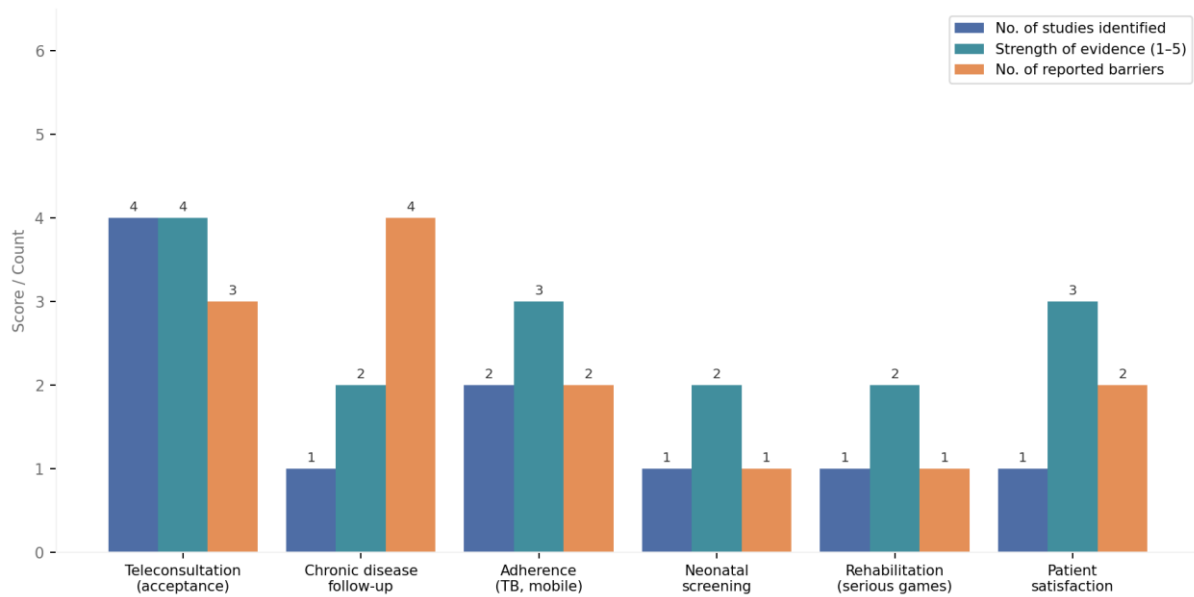


Figure N°3: Evidence map: telemedicine implementation domains and study outcomes in Morocco (2017–2025)

Source: Authors, based on systematic review of Moroccan telemedicine literature

5. Cross-Cutting Constraints and Priority Directions

Across the Moroccan evidence base, barriers consistently cluster into five categories:

Infrastructure quality and connectivity: affecting teleconsultation reliability, particularly in rural and peri-urban areas

Fragmented EHR/HMIS systems: limiting continuity of care and patient safety in longitudinal telemedicine workflows

Workforce capacity and training needs: identified at the hospital level as a barrier to both adoption and effective use

Workflow integration and sustainability: beyond crisis periods, requiring incentive alignment and ongoing institutional support

Equity and patient-experience considerations: requiring systematic evaluation to ensure that digital tools do not widen existing disparities

National strategy addresses these constraints through a dedicated digital-health governance body with regulatory authority, certification roles, and coordination responsibilities. The White Paper stresses that e-health transition must cover governance, safety, ethics, regulation, and professional training holistically, and identifies workforce capacity building as a central implementation requirement (*White-Paper-on-e-Health-in-Morocco*, n.d.).

Priority area	Current status (evidence)	Short-term action (1-3 yrs)	Medium-term goal (3-7 yrs)
Governance	No dedicated digital-health authority	Establish regulatory body; adopt e-health law	Fully operational governance with certification system
Infrastructure	Coverage gaps; rural connectivity deficits	Prioritize broadband rollout at peripheral facilities	National minimum connectivity standard for health facilities
Interoperability	Siloed HIS; no shared patient ID	Pilot shared electronic medical record in 2+ regions	Deploy national interoperable HIS (projected 2030)
Workforce training	Ad hoc training; not integrated in curricula	Include digital health in medical/nursing education	Certified digital health competency for all practitioners
Evaluation & equity	Feasibility studies dominate; quality/equity data scarce	Fund outcome studies with equity disaggregation	National telemedicine performance dashboard

Table N°4: Priority matrix for sustainable telemedicine integration in Morocco

Source: Authors, based on literature review and White Paper on e-Health in Morocco (n.d.)

6. Conclusion

This review has examined telemedicine development in Morocco through three interconnected lenses: the institutional and regulatory framework, digital readiness and health information system interoperability, and the empirical evidence generated by clinical and public health implementations. Taken together, these dimensions reveal a system that is moving ; unevenly, and with significant structural constraints ; beyond isolated pilot projects toward something more deliberate and potentially more durable.

From a theoretical standpoint, the Moroccan case confirms that technology adoption in health systems cannot be reduced to platform deployment. The technology acceptance model, applied in this context, helps explain why clinician adoption remains variable: perceived usefulness is generally positive, but perceived ease of use is undermined by connectivity deficits, insufficient training, and workflows that have not been adapted to remote care. The health information system strengthening framework is equally illuminating: it makes clear that telemedicine cannot reach its potential on top of a fragmented information infrastructure. Interoperability is not a peripheral technical concern ; it is a precondition for the continuity and safety of care that telemedicine is supposed to support.

Methodologically, the evidence base reviewed in this article is largely composed of feasibility and acceptability studies, which is appropriate for an early-stage field but increasingly insufficient as telemedicine becomes more embedded in policy commitments. Morocco now needs a second generation of research that goes beyond asking whether telemedicine works under controlled or crisis conditions, and begins systematically asking whether it improves clinical outcomes, enhances the patient experience, and distributes benefits equitably across population groups.

From an empirical standpoint, the findings are consistent across domains. Teleconsultation demonstrates clear potential but faces recurring implementation barriers. Chronic disease management by telemedicine requires more rigorous protocols than simple transplantation from in-person settings. Mobile-supported public health interventions show genuine promise, particularly in communicable disease control. Technology-supported screening and rehabilitation tools can achieve meaningful uptake, including among populations with limited digital experience, when design and implementation support are adequate.

The central practical recommendation emerging from this review is that Morocco's next phase of telemedicine development must prioritize coherent governance, interoperable infrastructure, and comprehensive professional training as foundational investments ; not as afterthoughts to be addressed once enough pilots have been completed. The evidence is sufficiently abundant to support this reorientation. What is needed now is institutional will to move from project-level experimentation to system-level integration.

Under these conditions, telemedicine has the genuine potential to become a durable and equity-enhancing component of healthcare delivery in Morocco. Achieving that potential will depend on the capacity of institutions to align on shared objectives, sustain commitments beyond crisis periods, and submit digital health tools to the same rigour of evaluation that is expected of any other clinical intervention.

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