



Digital Innovations for Strengthening Health Security in The Global South

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1. Introduction: Moving Beyond Technological Adoption

Health security threats are intensifying across the Global South at a time when digital transformation is advancing unevenly across health systems. Global assessments continue to highlight persistent preparedness gaps and fragmented surveillance capacities (Independent Panel for Pandemic Preparedness and Response, 2021; World Health Organization [WHO], 2023a). Although numerous digital initiatives, ranging from surveillance platforms to AI-enabled analytics, have demonstrated promise, systemic integration, interoperability, governance clarity, and sustained financing remain limited.

The COVID-19 pandemic accelerated digital adoption across many countries. Platforms for vaccine logistics, disease reporting, teleconsultation, and predictive analytics expanded rapidly, demonstrating scalability under crisis conditions (WHO, 2024a; UNDP, 2024b). However, the rapid proliferation of tools has not consistently translated into integrated digital ecosystems. In many settings, pilot projects coexist without interoperability, surveillance systems operate in silos, AI tools are deployed without harmonized validation standards, and cross-border data-sharing frameworks remain underdeveloped. Financing patterns continue to be crisis-driven rather than institutionalized, despite

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evidence that sustained investment in health systems yields significant development returns (World Bank, 2024).

This policy brief argues that the central challenge is no longer technological feasibility but systemic transformation. Governance coherence, institutional ownership, regulatory clarity, workforce adaptation, and long-term financing are now the decisive factors determining whether digital innovation strengthens health security or remains fragmented.

The analysis is informed by deliberations from an international workshop on Artificial Intelligence and Health Security that convened policymakers, public health institutions, regional organizations, and technical experts from across the Global South. The discussions revealed common governance dilemmas, operational bottlenecks, and sovereignty concerns that transcend national contexts. The recommendations presented here synthesize these cross-regional insights and identify structural reforms necessary to transition from fragmented initiatives to resilient, system-wide digital health security.

Five interconnected priorities structure this analysis: establishing risk-tiered AI governance frameworks; developing federated cross-border data architectures; institutionalizing digital health as core public infrastructure; redesigning systems to reduce frontline worker burden; and embedding equity and benefit-sharing principles into digital ecosystems. These priorities align with the WHO Global Strategy on Digital Health 2024–2030 (WHO, 2024a) and evolving regional digital transformation agendas (African

Union Development Agency, 2024; ASEAN Secretariat, 2023).

Across the Global South, digital health adoption has accelerated significantly in recent years, particularly following COVID-19. The WHO has emphasized the need to move from emergency-driven digital responses toward integrated, long-term systems (WHO, 2024a). Platforms for vaccine logistics, disease surveillance, teleconsultation, and predictive analytics have demonstrated measurable benefits, including cross-country learning initiatives such as the scaling of eVIN (UNDP, 2024b).

However, consultations reveal a widening gap between technological deployment and systemic integration. Pilot projects proliferate, yet interoperability gaps persist. Surveillance systems remain fragmented, AI tools are introduced without harmonized validation standards, and cross-border data-sharing frameworks remain underdeveloped. Financing continues to be crisis-driven rather than institutionalized, despite evidence that sustained health investments yield significant development returns (World Bank, 2024).

The challenge facing countries is no longer technological feasibility. It is governance coherence, institutional ownership, coordination across sectors, and long-term sustainability.

2. Current Landscape: Progress and Structural Constraints

Several countries in the Global South have demonstrated meaningful progress in digital integration. Regional frameworks for cross-border

Table 1: Transitioning from Fragmented Pilots to Integrated Digital Health Systems

Fragmented State	Systemic State
Siloed platforms	Interoperable ecosystem
Crisis-driven funding	Institutionalized financing
Ad hoc AI tools	Risk-tiered governance
Isolated national data	Federated regional architecture
High worker burden	Human-centred workflows

disease surveillance are emerging (African Union & Africa CDC, 2024), while national digital ecosystems such as Indonesia’s SATU SEHAT initiative illustrate efforts to consolidate fragmented reporting structures (Government of Indonesia, 2025). AI-supported surveillance, including media analytics collaborations, has enhanced early signal detection in partnership with public health authorities (Wadhvani Institute for Artificial Intelligence, 2025).

The International Health Regulations (2005) underscore the importance of timely digital surveillance systems for early detection and reporting (WHO, 2024b). Nevertheless, structural constraints remain significant. Real-time surveillance coverage is incomplete in many settings, and shortages of epidemiologists, data scientists, and digital governance specialists limit system functionality. One Health integration across human, animal, and environmental domains remains uneven.

Regulatory ambiguity surrounding AI deployment further complicates scale-up. The WHO’s guidance on ethics and governance of AI for health stresses transparency, accountability, and human oversight (WHO, 2023b). Emerging national frameworks, including draft AI strategies and data

protection legislation in countries such as India, reflect attempts to clarify these domains (Government of India, 2024; Indian Council of Medical Research [ICMR], 2025).

Digital divides, particularly in rural and underserved regions, continue to undermine equitable access. Moreover, global debates around data sovereignty and digital colonialism highlight concerns regarding unequal value extraction and control over health data (Floridi & Taddeo, 2024).

3. Strategic Policy Priorities

3.1 Risk-Tiered Governance for AI in Health

Artificial intelligence applications in health range from administrative automation to clinical decision support and outbreak prediction. Governance frameworks must differentiate between levels of risk and apply proportionate oversight. International normative guidance emphasizes safety, transparency, explainability, and fairness as foundational principles (WHO, 2023b).

National validation criteria should address safety, efficacy, explainability, and equity impacts, drawing from both global ethical frameworks and emerging domestic strategies (ICMR, 2025). Institutional

mechanisms for human oversight must remain central, particularly in clinical contexts. Transparent registries of deployed AI tools and post-deployment audit mechanisms can strengthen accountability while reducing regulatory ambiguity.

Attention to bias is particularly critical. Empirical research has

demonstrated that AI systems may reproduce intersectional disparities when trained on non-representative datasets (Buolamwini& Gebru, 2018). Embedding bias assessments and inclusive data strategies into governance frameworks is therefore essential.

Table 2: Illustrative Risk-Tiered Governance Model for Health AI

Risk Level	Example Applications	Governance Requirements
Low	Administrative automation	Basic transparency, audit logs
Moderate	Surveillance analytics	Validation testing, bias review
High	Clinical decision support	Regulatory approval, human oversight, post-market audit

3.2 Federated Cross-Border Data Architectures

Infectious diseases do not respect national boundaries. Effective regional health security depends on structured data exchange mechanisms, consistent with IHR obligations (WHO, 2024b). Regional digital governance frameworks such as those developed within ASEAN and the African Union provide emerging models for structured cooperation (African Union & Africa CDC, 2024; ASEAN Secretariat, 2023).

Federated data architectures offer a pragmatic pathway forward. Under such models, countries retain control over primary datasets while sharing agreed indicators for regional surveillance and early warning. Such approaches help address sovereignty concerns while facilitating collaboration. The broader policy discourse on data sovereignty and

data nationalism underscores the importance of designing cooperation frameworks that prevent exploitative or asymmetrical arrangements (Floridi& Taddeo, 2024).

3.3 Institutionalizing Digital Health as Public Infrastructure

Digital health systems must be treated as foundational public infrastructure rather than discretionary projects. The WHO Global Strategy on Digital Health calls for integrating digital systems into national health planning and financing frameworks (WHO, 2024a). Similarly, global development analyses emphasize sustained investment in health systems as critical for economic resilience (World Bank, 2024).

Embedding digital platforms within national budgets, procurement policies, and preparedness plans is

essential. Legislative and regulatory frameworks such as data protection implementation guidelines must be aligned with health-sector digitalization (Government of India, 2024). Without institutionalization, digital tools risk remaining donor-dependent or crisis-triggered rather than forming the backbone of preparedness.

3.4 Human-Centred System Design

Frontline health workers frequently face multiple, duplicative reporting requirements across disconnected platforms. Evidence from digital health governance analyses in low- and middle-income countries highlights the importance of usability, interoperability, and contextual adaptation (Lancet Digital Health Commission, 2024; International Institute for Sustainable Development [IISD], 2024).

Integrating platforms to enable single-point data entry, embedding automated alerts, and conducting workflow assessments prior to procurement can improve compliance and data quality. Human-centred design is not merely a usability consideration; it is fundamental to system reliability and health security.

3.5 Equity, Inclusion, and Benefit-Sharing

Digital transformation risks reinforcing inequities if marginalized populations remain underrepresented in datasets or excluded from digital access. Bias in algorithmic systems has been well documented (Buolamwini & Gebru, 2018), and global ethical frameworks stress inclusivity and fairness (WHO, 2023b).

Inclusive data collection strategies, transparent governance of data partnerships, and mechanisms for ensuring domestic value creation are critical. Policy debates on data colonialism highlight the importance of equitable participation and benefit-sharing in cross-border data ecosystems (Floridi & Taddeo, 2024). Public trust in digital health systems depends on demonstrable fairness, accountability, and respect for sovereignty.

4. Roles and Responsibilities

National governments bear primary responsibility for strategic direction, regulatory clarity, and institutional ownership. Integrating digital health into preparedness planning aligns with global health security recommendations (Independent Panel for Pandemic Preparedness and Response, 2021; WHO, 2023a).

Regional organizations can facilitate harmonized standards, federated data-sharing agreements, and peer learning. Development partners play an important role in supporting capacity building and South-South exchange, as demonstrated in digital scaling initiatives (UNDP, 2024a, 2024b).

Private sector engagement remains important for innovation; however, procurement frameworks must prioritize interoperability, transparency, and accountability to prevent vendor lock-in and ensure system longevity.

5. Financing Sustainable Digital Health Security

Digital health financing in many settings remains fragmented and project-based. Yet global evidence underscores that

Table 3: Stakeholder Responsibilities in Digital Health Security

Actor	Primary Role	Priority Actions
National Governments	Regulation & Financing	AI validation, budget allocation
Regional Bodies	Harmonization	Data agreements, standards
Development Partners	Capacity building	Workforce training, tech transfer
Private Sector	Innovation	Interoperable solutions

preparedness investments generate substantial economic and social returns (World Bank, 2024). Aligning digital health financing with medium-term expenditure frameworks and preparedness strategies can enhance predictability and sustainability.

Blended financing mechanisms, regional platforms, and consolidation of duplicative pilots can redirect resources toward systemic strengthening. Institutional financing reforms are foundational to transitioning from experimentation to resilience.

6. Conclusion: Building Integrated Systems for Resilience

The Global South possesses substantial innovation capacity and contextual expertise. However, translating innovation into sustained health security requires structural reform. Risk-based AI governance, federated data-sharing models, sustained infrastructure investment, workforce-centred design, and equity safeguards provide actionable pathways toward resilient digital ecosystems.

Digital health security is not a technical adjunct to health systems. It is a strategic imperative for preparedness, sovereignty, and population well-being

(WHO, 2024a). Coordinated national and regional action can transform fragmented initiatives into integrated systems capable of responding to both routine public health demands and future crises.

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The word “DAKSHIN” (दक्षिण) is of Sanskrit origin, meaning “South.” The Hon’ble Prime Minister of India, Shri Narendra Modi, inaugurated DAKSHIN – Global South Centre of Excellence in November 2023. The initiative was inspired by the deliberations of Global South leaders during the Voice of the Global South Summits. DAKSHIN stands for Development and Knowledge Sharing Initiative. Hosted at the RIS, DAKSHIN has established linkages with leading think tanks and universities across the Global South and is building a dynamic network of scholars working on Global South issues.



AIC at RIS has been working to strengthen India’s strategic partnership with ASEAN in its realisation of the ASEAN Community. AIC at RIS undertakes research, policy advocacy and regular networking activities with relevant organisations and think-tanks in India and ASEAN countries, with the aim of providing policy inputs, up-to-date information, data resources and sustained interaction, for strengthening ASEAN-India partnership.



CMEC has been established at RIS under the aegis of the Ministry of Ports, Shipping and Waterways (MoPS&W), Government of India. CMEC is a collaboration between RIS and Indian Ports Association (IPA). It has been mandated to act as an advisory/technological arm of MoPSW to provide the analytical support on policies and their implementation.



FITM is a joint initiative by the Ministry of Ayush and RIS. It has been established with the objective of undertaking policy research on economy, intellectual property rights (IPRs) trade, sustainability and international cooperation in traditional medicines. FITM provides analytical support to the Ministry of Ayush on policy and strategy responses on emerging national and global developments.



BEF aims to serve as a dedicated platform for fostering dialogue on promoting the concept in the Indian Ocean and other regions. The forum focuses on conducting studies on the potential, prospects and challenges of blue economy; providing regular inputs to practitioners in the government and the private sectors; and promoting advocacy for its smooth adoption in national economic policies.



FIDC, has been engaged in exploring nuances of India’s development cooperation programme, keeping in view the wider perspective of South-South Cooperation in the backdrop of international development cooperation scenario. It is a tripartite initiative of the Development Partnership Administration (DPA) of the Ministry of External Affairs, Government of India, academia and civil society organisations.



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As part of its work programme, RIS has been deeply involved in strengthening economic integration in the South Asia region. In this context, the role of the South Asia Centre for Policy Studies (SACEPS) is very important. SACEPS is a network organisation engaged in addressing regional issues of common concerns in South Asia.



Knowledge generated endogenously among the Southern partners can help in consolidation of stronger common issues at different global policy fora. The purpose of NeST is to provide a global platform for Southern Think-Tanks for collaboratively generating, systematising, consolidating and sharing knowledge on South South Cooperation approaches for international development.



DST-Satellite Centre for Policy Research on STI Diplomacy at RIS aims to advance policy research at the intersection of science, technology, innovation (STI) and diplomacy, in alignment with India’s developmental priorities and foreign policy objectives.

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