African Health Policy Alliance

From Strategy to System:

An Assessment of South Africa's National Digital Health Strategy (2019-2024)

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Content

Executive Summary

Background: In 2026, digital health transitioned from a series of experimental pilot projects to a fundamental infrastructure for achieving Universal Health Coverage (UHC). This momentum is driven by the World Health Assembly's recent extension of the Global Strategy on Digital Health through 2027, with a follow-up framework already in development for 2028–2033.

This strategy calls on countries to develop national digital health strategies covering governance, infrastructure, workforce, services, and interoperability (WHO, 2021). South Africa released the National Digital Health Strategy 2019-2024 to guide the digital transformation of its health system, aligning with national goals and global trends.

Objective: This study evaluates South Africa's digital health strategy as a policy, using the categories from a 2025 comparative African strategy analysis by Sylla, B. et al. (2025), and examines real-world evidence of implementation to revise how the strategy's goals have been realised in practice.

Methods: We conducted a document analysis of the South African strategy, coding the content according to four dimensions (context, content, priority actions, innovation) used in the Nature article by Sylla, B. et al. (2025). We also reviewed World Health Organization (WHO) guidelines and collected literature and reports on the implementation of digital health in South Africa. We summarised strengths, gaps, and examples, and evaluated whether each example supports or contradicts the strategy.

Results: The South African strategy clearly defines a vision aligned with "better health for all South Africans enabled by digital health," anchored in national health priorities (National Department of Health (NDoH), 2019) and is also aligned with WHO-recommended components. It is notably comprehensive in addressing enabling environment factors, including leadership, stakeholder engagement, investment, governance, interoperability, workforce, and policy frameworks. However, several objectives and actions are articulated at a high level and lack baseline indicators or measurable targets, thereby limiting their evaluability. The strategy also signals the importance of innovation but provides limited operational detail on how innovation will be integrated. The implementation evidence indicates mixed progress. There has been measurable advancement in some foundational building blocks and selected digital services, like 68 million individual records in the Health Patient Registration System (HPRS) identifiers (NDoH, 2025). On the other side, persistent bottlenecks, particularly uneven facility connectivity, and continued fragmentation of major information systems, have constrained interoperability and system-wide scale-up by the end of the strategy period (Global Fund, 2025; NDoH, 2025).

Conclusion: South Africa's digital health strategy is a strong and comprehensive policy document that aligns well with international guidance and positions the country as a potential leader in digital health strategy design in the Global South. Nonetheless, the realisation of system-wide impact has been uneven, underscoring the need for the next strategic cycle to strengthen measurement, prioritise practical interoperability, and address infrastructure and adoption constraints through sustained investment and adaptive governance.

1. Introduction

Digital health is the use of information and communication technologies to improve health services and has become a global health priority. In 2018, the World Health Assembly urged member states to integrate digital technologies to accelerate health goals like UHC (NDoH, 2019). The WHO subsequently released a Global Strategy on Digital Health 2020-2025, calling for coordinated national digital health efforts aligned with health system needs and emphasising governance, infrastructure, workforce, standards, and innovation (WHO, 2021).

Low- and middle-income countries (LMICs) have increasingly developed national eHealth or digital health strategies in response to this global push. In Africa alone, nearly 48 countries have some form of digital health plan on record (Sylla et al., 2025). These strategies aim to harness technologies ranging from electronic health records (EHR) to mobile apps and telemedicine to address longstanding challenges in health service access, quality, and efficiency.

South Africa presents a compelling context for examining a national digital health strategy. The country is burdened by a multitude of public health challenges: HIV and TB, maternal and child health issues, non-communicable diseases, and violence/injuries, and persistent health system inequalities (NDoH, 2019). Efforts to achieve UHC are underway through the envisioned National Health Insurance (NHI) system, which will rely on robust health information systems for success. South Africa has also been a digital health pioneer in sub-Saharan Africa. It is known for early implementations like the District Health Information System (DHIS) for routine data, the MomConnect mobile messaging programme for maternal health, and a national patient registration system pilot. By 2019, a new national Digital Health Strategy (2019-2024) was formulated to build on the prior eHealth Strategy (2012-2016) and align with both national development agendas and opportunities of the Fourth Industrial Revolution. This strategy was expected to guide investments and coordinate stakeholders across public and private sectors towards a “better health for all South Africans enabled by digital health” (NDoH, 2019).

A systematic examination of such strategy documents is needed to identify their strengths and gaps. A recent comparative analysis of 11 African digital health plans identified common weaknesses in contextualisation (e.g., missing socioeconomic data), a lack of linkage between stated health system challenges and digital interventions, and minimal consideration of emerging technologies (Sylla et al., 2025). It is essential to assess where South Africa’s strategy stands on these fronts. Furthermore, bridging the gap between strategy and implementation is notoriously difficult, therefore documenting real-world progress helps evaluate the strategy’s realism and impact. South Africa’s experience can offer lessons for other LMICs crafting or updating digital health policies.

This study contributes to this examination by addressing two primary questions:
(1) How does South Africa’s National Digital Health Strategy (2019-2024) align with the recommended categories and best practices identified in the literature from Sylla et al., 2025 framework?
(2) What gaps emerge from this assessment, and what does real-world evidence from 2019-2025 indicate about the strategy’s implementation, i.e., are there concrete examples of success or shortfall in areas like governance, interoperability, financing, workforce, and digital health services?

2. Literature Review

2.1 WHO Global Strategy on Digital Health

WHO's Global Strategy on Digital Health offers a high-level plan for nations, highlighting that digital health efforts should focus on people, be integrated, and have sustainable resources. It sets out four main goals: (1) foster global collaboration and knowledge sharing; (2) encourage countries to develop or improve a national digital health strategy tailored to their needs; (3) enhance digital health governance and workforce capacity; and (4) promote human-centered, inclusive health systems powered by digital tools. For national strategies, the WHO suggests an "all-inclusive multistakeholder approach" and identifies nine key areas that such strategies should address. These include leadership and governance, strategy and investment, services and applications, standards and interoperability, infrastructure, legislation, policies, and compliance (including ethics), workforce, and a people-centered approach. Essentially, a country's plan should not merely list technology projects but also focus on creating the right environment, securing political support, establishing regulatory protections, such as data privacy, developing digital skills in the health workforce, and aligning with health priorities and resources. The WHO strategy emphasises ongoing monitoring and capacity-building during implementation. These guidelines set a standard: a comprehensive national strategy should incorporate most of these elements. South Africa's 2019-2024 plan was developed as the WHO global strategy was emerging, but it was clearly guided by the core principles of UHC and health system strengthening through digital means.

2.2 African Digital Health Strategy Analysis

A recent comparative study by Sylla et al. (2025) systematically examined 11 national digital health strategic plans in Africa. Using the Walt and Gilson "policy triangle" (context, content, process, actors) as a foundation, augmented by the WHO/ITU eHealth strategy toolkit criteria, the authors evaluated four key dimensions of each strategy: Context, Content, Priority Actions, and Inclusion of Emerging Technologies.

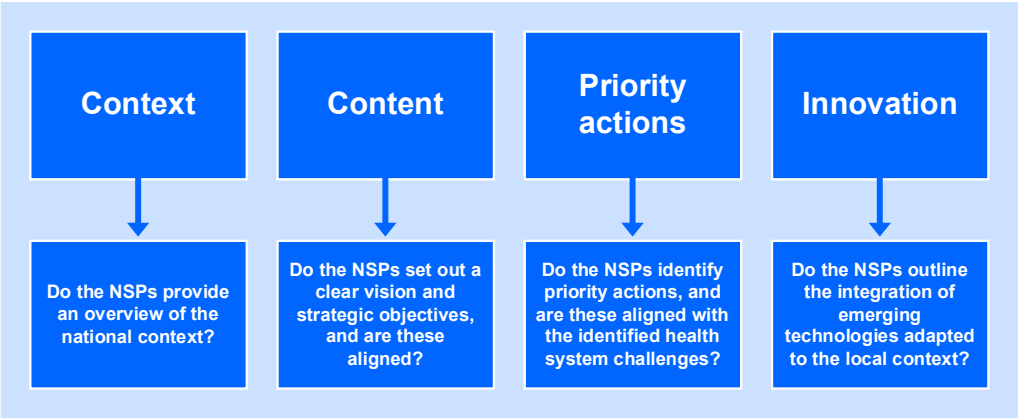
For **Context**, they assessed whether the plans described the country's socio-demographic and health state, the health system challenges being addressed, and the state of the enabling environment pillars.
Under **Content**, they assessed the presence of a clear vision and strategic objectives, and whether those objectives were aligned with the stated vision and health needs.
Priority actions corresponded to the digital health interventions (DHIs) planned and then mapped against the WHO classification of digital health interventions, and whether these interventions aligned with the country's identified health system challenges.
The **Innovation /Emerging Technology** dimension assessed whether strategies focused on new technologies (e.g., AI, Internet of Things) or on support for local innovation ecosystems.

The findings from this 2025 analysis highlighted several common gaps. Only 1 of 11 countries (Guinea) provided a complete set of baseline health and socio-economic indicators in its strategy, many omitted such context data entirely. More than half of the strategies did not explicitly state the key health system challenges they aimed to address, instead focusing narrowly on technical health IT issues. Likewise, many neglected specific pillars of the enabling environment—notably human resources, legal frameworks, financing, and interoperability—were frequently underdeveloped across plans. Most countries had an

overarching vision tied to national health goals (e.g., UHC), but the study noted these visions were often rhetorical, not backed by clear targets, and needed translation into concrete action plans. In terms of planned interventions, there was a bias toward provider-facing tools (45% of all listed interventions across countries), with far fewer client-facing solutions (7%), raising equity concerns if citizens' access to tools were limited. Crucially, none of the 11 strategies explicitly planned for integrating emerging technologies, innovation was mentioned in passing, if at all. The authors pointed to this "technological foresight" gap as a missed opportunity for future-proofing strategies. They recommended that future national plans include a minimum standardised set of contextual indicators and a formal consideration of health challenges and innovation, to improve relevance and accountability.

This Africa-wide analysis provides a lens through which to assess South Africa's strategy: we aim to identify these elements and assess whether South Africa's 2019-2024 strategy avoids or shares the common weaknesses identified.

Figure 2.1: Conceptual framework of Sylla et al. (adapted from Sylla et al. (2025)).



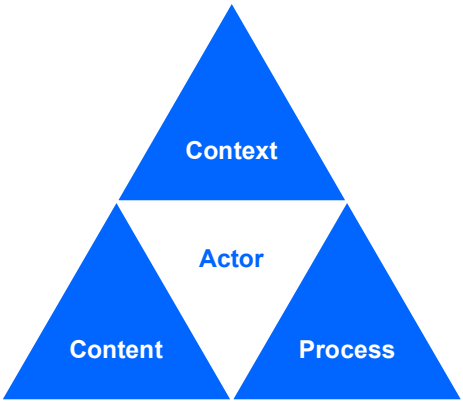
2.3 Internet of medical things, policies, and geriatrics: An analysis of the national digital health strategy for South Africa 2019-2024 from the policy triangle framework perspective

The academic examination of South Africa's digital health policy remains in its early stages. One notable study by Kante and Ndayizigamiye (2021) applied Walt & Gilson's policy triangle framework to the South African 2019-2024 strategy, with a specific focus on the provision of healthcare to the elderly via the Internet of Medical Things (IoMT). Their analysis considered the strategy's context, content, process, and actors, particularly its recognition of IoMT and the needs of geriatric populations. They found the strategy to be "comprehensive" overall and suggested that it could serve as a model for incorporating emerging technologies into eHealth plans in developing countries. However, that study's scope was narrow, focusing on a single technology domain (IoMT) and a single population group, and it did not assess implementation progress. Our study extends this by providing a broader assessment across multiple strategy dimensions and by linking strategy to evidence of implementation. Another relevant perspective comes from policy and civil society discourse. There is recognition that digital health is critical to South Africa's NHI and that multi-sectoral collaboration, like public-private partnerships, will be necessary for its success. For example, Botha et al. (2024) document strategies and experiences in developing South Africa's National Health Information System, emphasising ecosystem approaches and stakeholder engagement as keys to scaling

solutions. We build on these insights by explicitly evaluating how stakeholder engagement and cross-sector partnerships are addressed in the strategy and reflected in practice.

In summary, the literature suggests that while South Africa's strategy is considered robust in content, there is a need for systematic assessment against standardised criteria and for an examination of real-world outcomes. Our study occupies this gap by (a) systematically reviewing the strategy document through the lens of Sylla et al. (2025) and (b) assessing on-the-ground digital health developments in South Africa since the strategy's launch. This combined approach provides a more holistic understanding of both policy quality and policy execution, which is valuable for course corrections and for informing the next national digital health strategy.

Figure 2.2: The Walt & Gilson (1994) policy triangle model (adapted from Walt & Gilson 1994).



3. Methods

3.1 Study Design and Document Corpus:

We conducted a qualitative assessment of policy documents and a narrative review of implementation evidence. The primary documents analysed were: (i) the National Digital Health Strategy for South Africa, 2019-2024, (ii) the WHO Global Strategy on Digital Health 2020-2025, (iii) the paper by Sylla et al. (2025) published in Nature, which provided a comparative analysis of African digital health strategic plans, and (iv) prior South African eHealth policy analyses by Kante & Ndayizigamiye with other sources on South African digital health initiatives from 2018 onward. Content analysis was guided by categories from Sylla et al. (2025), including "Context," "Content," "Priority Actions," and "Innovation," noting whether sub-elements were present in the South African strategy. For "Real-World Evidence Synthesis," we used a narrative synthesis, grouping evidence into themes, illustrating status with examples, and evaluating if evidence supports the strategy's outcomes.

3.2 Search and Inclusion Strategy:

For the strategy assessment, the key texts were known in advance. To gather implementation evidence, we searched academic databases and grey literature (government websites, WHO and NGO reports, and news outlets with credible health IT reporting) up to December 2025. We also searched by specific programme names (e.g., "MomConnect South Africa evaluation") to ensure coverage of known initiatives.

3.3 Limitations:

There are important limitations to be noted. First, our analysis is document-based. We rely on published and reported information. Thus, if specific initiatives lack public documentation, they may be overlooked, potentially underestimating progress. Conversely, documented successes might reflect best-case scenarios rather than the average implementation status. We did not conduct primary field research or stakeholder interviews, which could have provided additional insights into the process and actor dynamics. Second, in assessing alignment with "best practices," we recognise that each country's context differs. What is labelled a gap might have been an intentional choice due to local considerations. We attempt to flag clearly where information is missing or uncertain. Finally, linking real-world outcomes to the strategy has an attribution challenge. We can observe progress or shortcomings, but we often cannot definitively say the strategy caused them. Our approach is to discuss them as correlates or consistency checks rather than direct causal results of the strategy. Despite these limitations, we believe this comprehensive mixed-methods analysis offers valuable insight into South Africa's digital health journey, from strategy to implementation.

4. Results: Strategy Document Assessment

Using the Sylla et al. (2025) framework, we present findings on the Context, Content, Priority Actions, and Innovation dimensions of the South African strategy.

4.1 Context

South Africa's strategy roots the digital health agenda in global developments, citing the 2018 World Health Assembly resolution on digital health and impending WHO global strategy, and national imperatives of the NHI policy and National Development Plan (NDP) goals. The situational analysis reviews the status of the previous eHealth Strategy and notes achievements, including the creation of governance bodies, alongside persistent constraints such as fragmented systems and broadband gaps. The situational analysis is especially useful and is fairly candid about persistent constraints like fragmented systems and broadband gaps. Overall, it signals policy continuity by learning from earlier efforts and makes the "baseline" environment clear.

The strategy document explicitly lists both health system challenges and digital health challenges. It includes broad system aims (e.g., "Reduction of mortality and morbidity", "Improving quality of care") and digital health-specific issues (e.g., "value for money of systems", "fragmented systems"). It also links digital tools to health reform, including primary health care re-engineering and NHI implementation.

The strategy does not provide baseline quantitative indicators *(*e.g., connectivity levels in facilities, workforce digital skills, or other health system ratios). The context section also does not clearly map the actor landscape, as the strategy only names a limited set of specific partners and stakeholders beyond government.

4.2 Content

The strategy articulates a vision of "Better health for all South Africans enabled by person-centered digital health." This phrasing keeps health outcomes ("better health for all") at the forefront, with digital health as an enabler, which guards against techno-centrism. It also

explicitly states “person-centered,” aligning with modern health quality discourse and the WHO’s emphasis on a people-centered approach (WHO, 2021). It aligns this vision with the Department of Health’s overall vision (“A long and healthy life for all”). The mission refers to an “integrated digital health ecosystem of people, processes, and technology.” The strategic principles emphasise end-user focus (patients and providers), equity and underserved reach, innovation, workforce development, and intersectoral collaboration, including a “whole-of-government” approach.

The strategy presents components in a structured way, with domains (e.g., Leadership, Investment) linked to interventions. It mirrors WHO/ITU eHealth framework domains and includes deliberate choices such as separating “Leadership” and “Governance” as a distinct area. It also includes attention to legislation, policy, and standards.

Actions are described largely without timelines and quantitative targets, aside from a small number of dated statements (e.g., review and alignment of governance structures by 2020). There are no clear commitments like “X% of facilities connected by 2024” or “Y health workers trained by 2022,” which means performance management depends on separate implementation indicators. This gap is not unique. Sylla et al. note that many strategies struggle to translate broad visions into measurable objectives, but this still limits evaluability.

4.3 Priority Actions

South Africa’s strategy lists an ambitious suite of interventions that address both foundational digital health architecture and specific solutions. It emphasises a unique patient identifier and the patient registry HPRS as a cornerstone for integration. Establishing a Master Patient Index (using national ID number) is presented as central to integration. The strategy notes that this leverages work “already accomplished” with HPRS. The strategy builds on the Health Normative Standards Framework (developed in 2014) and commits to conformance testing for systems.

The strategy describes achieving an EHR “through integrating existing solutions on a common platform”. A roadmap for EHR is mentioned, though details are not in the strategy. It calls for rationalising mobile health through a Health Play Store for approved applications and cites MomConnect as a success case, noting over 2.5 million registered mothers as of 31 March 2019. This intervention aims at controlling quality, security, duplication, and the proliferation of pilots.

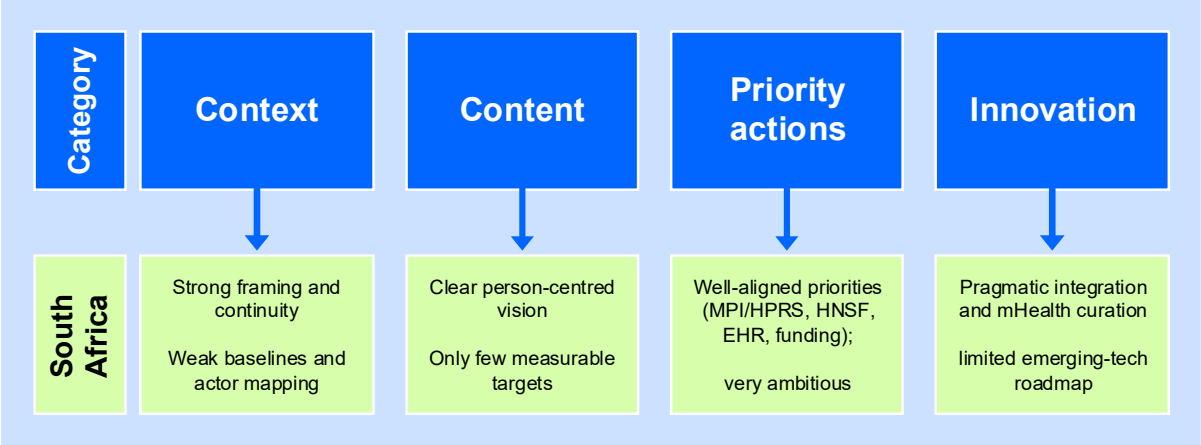
The strategy proposes establishing a national digital health grant and targeting a 3-5% budget share and includes governance review by 2020. Across the priority actions, alignment is generally tight: e.g., “high market-driven costs of broadband” was a noted challenge, and accordingly, the plan is to build a government-led health network with relevant departments, negotiating better terms. “Inadequate human resource capacity” is tackled by the workforce plan and training. “Cybersecurity” risk is met with a promise of new regulations focusing on data protection and security. This one-to-one correspondence shows a logical consistency in the strategy.

4.4 Innovation/Emerging Technologies

The strategy primarily takes an indirect approach to innovation. It begins by establishing infrastructure and policies that foster innovation, then promotes an innovative culture through guiding principles and proposed hubs. It mentions IoT and AI in definitional sections and

references the Presidential Commission on the Fourth Industrial Revolution. However, it does not specify any pilot projects or plans for adopting emerging technologies. Instead, South Africa's strategy focuses on creating an enabling environment.

Figure 4.1: Results of the conceptual framework of Sylla et al. (adapted from Sylla et al. (2025)).



5. Results: Real-World Evidence and System Landscape (2019-2025)

We now present evidence from South Africa's digital health implementation during the strategy period, organised by thematic areas aligned with major strategy objectives.

5.1 Unique Patient Identification and Health Patient Registration System (HPRS)

One of the strategy's foundational goals was to establish an integrated patient identity and electronic health record system nationwide. HPRS assigns unique patient identifiers, linked to the national ID. This allows registered patients at health facilities, creating a master patient index needed for a national EHR. HPRS has also been explicitly linked to NHI pilot activities, matching the strategy's framing of HPRS as an NHI enabler. By mid-2025, HPRS held over 68 million individual records (with data quality issues such as duplicates) and had been implemented in 3,265 public health facilities (NDoH, 2025). In KwaZulu-Natal (KZN), 488 facilities had functional installations by late 2025, with more than 3.7 million patients registered in the provincial public sector (Dawood, 2025).

However, coverage and routine use remain uneven. In June 2025, Parliament was told that 101 of 319 facilities in Northwest Province were actively using HPRS, with a 16% data synchronisation rate at that time (Parliament of South Africa, 2025). In KZN, none of the province's 72 public hospitals had fully implemented HPRS by late 2025, though 10 hospitals were identified for near-term pilots (Dawood, 2025).

Key barriers reported include insufficient infrastructure and training, and budget shortfalls. The KZN health department reported deep-rural connectivity limitations, gaps in functional equipment (computers and scanners), and phased procurement constrained by budgets (Dawood, 2025). Interoperability is also still incomplete: KZN noted that HPRS does not seamlessly interoperate with existing systems, including separate Electronic Medical Records (EMR) tools in hospitals (Dawood, 2025). Essentially, facilities have multiple digital systems that are not yet talking to each other, which the strategy had intended to fix via a national

architecture (NDoH, 2019). By 2025, an initiative has been introduced to use fingerprints from Home Affairs data for patient verification, enhancing the accuracy of unique IDs with HPRS (Global Fund, 2025).

5.2 Maternal Mobile Health and User Engagement: The MomConnect Programme

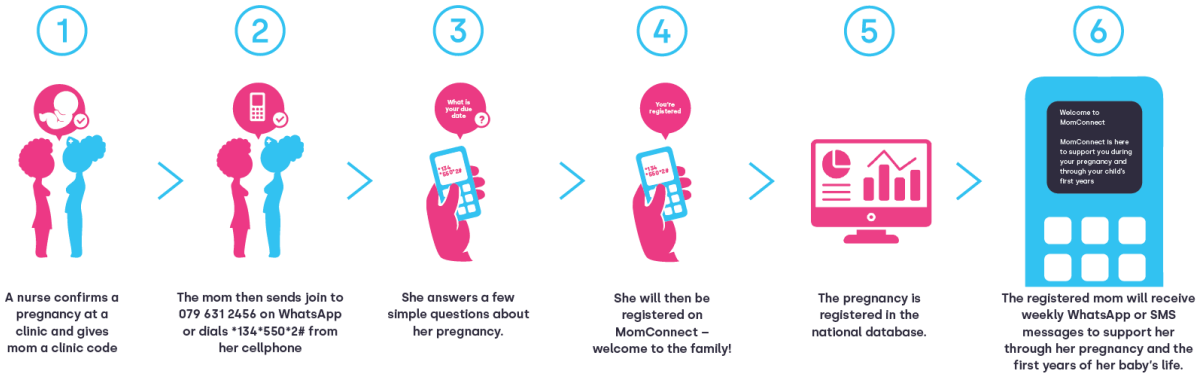
MomConnect (launched 2014) provides SMS-based maternal health messaging plus a helpdesk for questions and complaints. The strategy highlighted MomConnect as a success case, noting over 2.5 million mothers reached by early 2019.

By 2018, MomConnect had registered over 1.5 million users, covering an estimated 60% of pregnant women attending public antenatal services and operating in 95% of public health facilities nationwide. Reported effects included increased knowledge about pregnancy, high user satisfaction, and an enhanced sense of connection to the health system (Jahan et al., 2020). Many women reported that receiving weekly messages in their own language improved their confidence in caring for themselves and their babies, and thus even influencing family members' engagement.

The helpdesk addressed over 300,000 questions, with eight times more compliments than complaints. Analysis of roughly 1,300 complaints surfaced operational issues such as stockouts, long waits, and staff mistreatment, and enabled facility and area-level management responses (Jahan et al., 2020).

Limitations are instructive for the broader strategy. Sustainability remains a risk: maintaining a national SMS service and helpdesk costs about US$1 million per year (approximately ZAR 15 million), and funding has relied heavily on donors rather than routine government budgets (Jahan et al., 2020). MomConnect remains USSD and SMS based for equity and reach, therefore limits interactivity and newer functionality.

Figure 5.1: MomConnect Infographic (adapted from NDoH (2024)).



The wider ecosystem includes NurseConnect (2016), a sister programme supporting health workers. Qualitative evidence suggests nurses found it useful, but uptake depends on access to work phones and data (Fischer et al., 2019).

5.3 National Electronic Medical Record (EMR) and Interoperability Initiatives (e-Impilo)

The national EMR initiative e-Impilo is described as an emerging national effort linked to the EHR and interoperability agenda (Global Fund, 2025). By 2025, NDoH had begun beta implementation in primary health care: 55 facilities were using e-Impilo, with plans to roll out to 3,300 more over the next two years (Global Fund, 2025).

Reported design features include modular architecture, linkage to core registries (including unique IDs), and security controls such as role-based access (Global Fund, 2025). Legacy and programme systems were also reported as not interoperable, with e-Impilo positioned as the mechanism to address this (Global Fund, 2025).

5.4 Data Protection, and Cross-Sector Collaboration

The strategy's call to strengthen privacy, data sharing, and cybersecurity regulation is strongly reflected in South Africa's legal environment. The Protection of Personal Information Act (POPIA) (2013; enacted 2020) applies across sectors including health. External assessment describes South Africa's privacy governance as a best-practice foundation that is actively enforced (Global Fund, 2025).

The South Africa Digital Health Strategy aimed to review and strengthen governance structures by 2020. A National eHealth Committee and a Ministerial Advisory Committee on eHealth have existed since 2015. By 2021, South Africa's National Department of Health had established a Digital Health Directorate to oversee the implementation of the digital health strategy. The Directorate should release an assessment of the progress, but, to the author's knowledge, none is publicly available.

Another important aspect is collaboration with international and private partners. South Africa has been active in the global digital health arena, like the WHO's Global Digital Health Monitor (WHO, 2023) or other initiatives and private partners, including mobile network operator collaboration for MomConnect (Jahan et al., 2020).

5.5 Innovation and New Technologies in Practice

Although the strategy did not specify a detailed emerging technology roadmap, implementation between 2019 and 2025 shows concrete innovation, especially under COVID-19 pressures. Two illustrative examples are AI-enabled TB screening and the COVID-19 vaccine data system.

South Africa has a high TB burden, and screening all individuals with chest X-rays is resource-intensive due to a shortage of radiologists. In 2020, the NDoH introduced an innovative solution: computer-aided detection (CAD) software using AI to interpret digital chest X-rays for TB signs (Global Fund, 2025). With Global Fund support, 15 mobile containers and 23 vans with digital X-ray and AI capability were in operation, and this is set to increase to 55 units by 2028. Early results identified over 11,600 people with TB, 38% of whom had no symptoms, meaning the AI helped detect cases that traditional symptom screening would have missed (Global Fund, 2025).

The COVID-19 pandemic forced all countries to adopt digital solutions quickly. South Africa developed the Electronic Vaccination Data System (EVDS) in 2021 as a national online platform for vaccine registration, scheduling, and tracking. EVDS allowed citizens to register via web or USSD, managed appointments, and recorded vaccination data for millions of people. (Hofisi et al., 2021).

6. Discussion

6.1 Synthesis of Strategy Assessment and Implementation Evidence:

The strategy document presents a comprehensive policy architecture with explicit focus on governance arrangements, standards/interoperability, legal frameworks, workforce development, and stakeholder engagement. The attention to legislation, policy, and standards also addresses a recurring historical weakness: earlier eHealth initiatives often stalled due to weak governance and unclear standards, so giving these a dedicated focus is sensible. That is a notably strong stance because “standards on paper” often fail without enforcement. It also links digital health to major reforms, including NHI and primary health care re-engineering.

At the same time, two design features constrain evaluability and execution planning. First, the strategy provides limited baseline indicators in its contextualisation, which reduces the ability to assess progress on connectivity, workforce readiness, and facility capability over the strategy period. Second, beyond a small number of dated statements, the document provides limited operational specificity (few timelines and minimal quantitative targets), increasing reliance on implementation plans and monitoring products outside the strategy document itself.

Evidence from 2019-2025 shows material scale-up in selected foundations and services, but with uneven uptake and persistent fragmentation. HPRS achieved substantial reach in records and facility installations, yet reported routine use, data synchronisation, and hospital implementation varied substantially across provinces and settings. The reported barriers, connectivity constraints, equipment gaps, training limitations, and budget-constrained procurement, indicate that infrastructure and adoption capacity remain binding constraints for consistent use and for realising interoperability benefits. This also suggests that the strategy’s aspiration for a dedicated 3–5% budget share for digital health has not yet been realised consistently in practice. This is a partial contradiction to the strategy’s expectation that HPRS would function as a backbone connecting to a national HER. The rollout of HPRS partially supports the strategy’s goals. Anecdotal reports suggest HPRS has reduced duplicate patient registrations and can potentially shorten waiting times by retrieving records faster. Overall, HPRS is a work in progress that validates the strategy’s direction, but the timeline to full functionality has extended beyond 2024, reflecting an implementation gap rather than a flawed strategy concept.

In contrast, MomConnect demonstrates sustained national-scale deployment with documented reach and a high-volume feedback mechanism that surfaced operational service delivery issues and enabled management responses. MomConnect has also been associated with improvements like a national increase in antenatal clinic visits; while one cannot fully establish causality, the timing and feedback suggest it contributed to earlier antenatal clinic attendance, a critical factor in reducing maternal and perinatal mortality (Jahan et al., 2020). However, the reported operating costs and donor reliance point to sustainability risks that are relevant beyond MomConnect, given that digital services require continuous operational expenditure rather than only one-time capital investment. This reflects the tension between innovation and inclusion.

On interoperability and the national EHR trajectory, e-Impilo indicates movement from strategic intent toward implementation, but the persistence of non-interoperable legacy and programme systems suggests that system-wide integration remains incomplete beyond the

original strategy horizon. The strategy's description of achieving an EHR "through integrating existing solutions on a common platform" indicates a pragmatic approach but also underscores the complexity of integration in a fragmented baseline.

On innovation, the strategy's limited operational detail on emerging technologies contrasts with reported practice in which new technologies were deployed through programme opportunities and urgent needs (e.g., AI-enabled TB screening; EVDS during COVID-19). This is a clear example of cutting-edge technology integration into the health system, enabled through multi-sector partnership. "South Africa is well-positioned to integrate and lead on AI tools in health settings" (Global Fund, 2025). This pattern is consistent with adoption driven by situational imperatives more than by a detailed emerging-technology roadmap. This suggests future strategies should incorporate an innovation roadmap so that adoption of new tools can be more proactive.

6.2 Policy Implications:

Integrating Digital Health into Health System Strengthening: South Africa's experience confirms that a digital health strategy should not stand alone. It must be embedded in overall health system reform. Many successes show digital tools can support health outcomes, but failures to fully use systems show that broader system issues need simultaneous investment. For policymakers, this means digital health should be a chapter in the health sector strategy, not a side project. Encouragingly, South Africa's 2019-2024 strategy was aligned with NDP and UHC goals, which helped keep it relevant. Future strategies should continue that alignment and make it even more explicit by linking each digital initiative to specific health system performance indicators.

Prioritisation and Phasing: The strategy was very ambitious. The main concern is feasibility: achieving all these by 2024 was very ambitious, and even countries with strong health IT capacity have struggled to implement national EHRs and interoperability in short timelines. Implementation suggests that a more phased approach with clear priorities might have led to quicker wins. For instance, if connectivity and HPRS had been Phase 1 priorities before pushing EHR, perhaps more clinics would have reliable usage now. Going forward, priorities could be sequenced: e.g., Phase 1: connectivity + patient ID, Phase 2: facility-level electronic records, Phase 3: advanced analytics and AI. Trying all concurrently risks delays. Policymakers should consider staggering projects, focusing resources sequentially for maximum impact, while maintaining the integrated vision.

Funding and Sustainability: The partial shortfall signals that domestic resource allocation hasn't yet met the strategy's aspiration. The evidence from MomConnect's funding challenges and KZN's plea for donor support implies that without funds, initiatives risk stagnation. This underlines the policy implication that digital health is not a one-off capital project but requires ongoing operational expenditure. Funding is needed for software maintenance, data costs, training, etc. Ensuring sustainable financing, potentially through innovative means, is essential.

Monitoring, Evaluation, and Adaptation: The lack of concrete targets in the strategy made mid-course evaluation tricky. South Africa should have conducted a mid-term assessment, but the reports are not publicly available. It would be beneficial to have a digital health scorecard updated annually: e.g., number of facilities with X system, % of data reporting electronically, user satisfaction surveys, etc. This aligns with the WHO's call for iterative assessment. Given

that digital health is dynamic, regular evaluation allows adaptation. For instance, if by 2022 it was clear that HPRS uptake was low in some regions, targeted interventions could have been launched. For other countries, having clear metrics and performing routine check-ins is a recommended practice.

6.3 Limitations and Caution in Interpretation:

While discussing these implications, we acknowledge the limitations of our analysis, which inherently affect the certainty of policy recommendations. We relied on reported data; some progress might be unreported. For example, if a province quietly achieved something, we might not know from available sources. Conversely, positive reports could have a publication bias, so unsuccessful pilots may not be written about extensively. Therefore, our discussion is more confident where multiple sources converge and more cautious where evidence is thin.

6.4 Broader Context and Future Directions:

South Africa's experience has broader relevance. It shows that having a well-crafted strategy is a vital first step, but even with a good strategy, execution is tough without sustained leadership, funding, and capacity. One external factor was COVID-19, which, ironically, accelerated some digital health initiatives but also disrupted routine health services and budget while demonstrating the strategy's resilience.

In sum, the digital transformation of South Africa's health system is underway, guided by a solid strategic framework. The next phase must double down on the foundations laid, ensuring that piloted solutions reach every corner.

7. Conclusion

South Africa's National Digital Health Strategy 2019-2024 set in motion a comprehensive agenda to transform health care through technology. Implementation over the past five years has delivered notable building blocks: millions of patients uniquely registered, critical digital systems piloted or scaled, and an enabling policy environment fortified with data protection laws and stakeholder partnerships. These developments underscore that digital health is no longer an experiment in South Africa but a central component of health sector strengthening. Yet the journey from strategy to system change is ongoing. By 2024, South Africa has achieved partial digitalisation of its health system: robust in some areas like maternal mHealth and national patient ID use while lagging in others like fully integrated records and universal connectivity. Importantly, none of the gaps identified are impossible to bridge. The weaknesses are precisely those anticipated by the strategy and now visible through our analysis, providing clear targets for corrective action.

A key lesson from South Africa's experience is the value of a strong strategic foundation. The existence of a national strategy enabled quicker pivots and innovations because stakeholders had a reference point and a coordinated vision to plug into. Looking forward, there is an opportunity to consolidate gains and address shortcomings. The next strategy iteration should be even more actionable, with clear (numerical) targets and defined roles, grounded in the real-world lessons of the past five years. It should aim to fully institutionalise digital health so that using electronic systems is as routine as using a stethoscope for health workers, and accessing digital health support is as common as taking a medication for patients.

For the global community, South Africa's experiences offer both inspiration and caution. Inspiration in how a middle-income country can craft a world-class strategy and achieve innovations like national mobile health at scale. Caution in how even with such a strategy, tangible system-wide change requires time, persistent advocacy, and adaptation to on-the-ground realities. It reinforces the notion that digital health is a continuous process of evolution alongside technological advancement and changing health needs.

In conclusion, South Africa's National Digital Health Strategy (2019-2024) can be assessed as a forward-thinking and enabling blueprint that has guided the country toward a more digital, data-driven health system. With sustained commitment, adequate resources, and inclusive governance, the country can fulfil the strategy's vision of "Better health for all South Africans enabled by person-centred digital health" (NDoH, 2019).

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