



Collaborating for Digital Health and Care in Europe

NATIONAL EHEALTH STRATEGIC PLAN 2023-2028

Version 1.0 – 26 February 2024

Peer-review report

Authors: Marc Lange, Tino Marti, Janek Metsallik, Luc Nicolas - EHTEL

Version 1.0 – 26 February 2024

EHTEL Association, a.i.s.b.l.

Avenue de Tervuren, 168, box 2 B-1150 Brussels Belgium Tel: +32 2 230 15 34

info@ehtel.eu www.ehtel.eu

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Abbreviations

AI	Artificial intelligence
DHE	Digital Health Enterprise
EHDS	European Health Data Space
EHR	Electronic Health Record
EHTEL	European Health Telematics Association
EMR	Electronic Medical Record
EU	European Union
HIE	Health Information Exchange
HIV	Human immunodeficiency virus
HL7 FHIR	Health Level Seven Fast Healthcare Interoperability Resources
HSSP	Health Sector Strategic Plan
ICT	Information and communication technologies
IT	Information Technology
KPI	Key Performance Indicator
MINICT	Ministry of Information and Communication Technologies
NCD	Noncommunicable disease
NDHGC	National Digital Health Governance Committee
SDG	Sustainable Development Goals
SSP	Sector Strategic Plan
SWOT	Strengths Weaknesses Opportunities and Threats
TWG	Technical Working Group
UN	United Nations
WHO	World Health Organization

1 Introduction

1.1 Background and scope of the peer review

In 2018, the Republic of Rwanda initiated an ambitious health reform programme to improve its national health system by the publication of the first National Digital Health Strategy 2018-2023. After its completion, and in continuation of this strategic planning effort to modernise the health system, a second-generation strategic plan has been prepared by the Ministry of Health with the support of the World Health Organization.

The Ministry of Health of Rwanda has requested an expert peer review of the “National eHealth Strategic Plan 2023-2028” to the World Health Organization. EHTEL, the European Health Telematics Association, has been tasked to conduct the peer-review which includes a thorough, professional, and independent assessment of the plan with implementation opportunities and possible pitfalls, substantiated where necessary, by relevant best practices and experiences, and is concluded with a set of recommendations.

This review is facilitated by EHTEL in the context of the EHTELconnect service package that the Association offers to Member States. [EHTELconnect Peer Reviews](#) draw on EHTEL's expertise to provide an intense, professional, and independent assessment of client's plans and projects in the deployment of innovative digital health services and solutions. EHTEL has delivered in depth peer reviews eHealth strategies for the Ministry of Health of Sweden, of Finland and more recently of Uzbekistan. Under this service package, EHTEL provided also technical assistance to Czech Republic and Estonia.

1.2 Objective of the peer review

This peer-review of the “National eHealth Strategic Plan” for Rwanda (called Strategic Plan further down) aims at providing recommendations for improving the formulation, adoption, implementation and evaluation of the eHealth Strategic Plan. It will provide the Technical Committee of the Ministry of Health with recommendations of peers – each of them has a long-lasting experience in implementing eHealth in their region our country – on how to complement the Strategic Plan to maximise its impact and prepare a successful deployment of eHealth in Rwanda.

1.3 Methodology

To achieve the objectives of the Strategic Plan peer-review, four dimensions of the strategy have been analysed by the team of reviewers.

- **Internal coherence:** consistency along the (vertical) and across (horizontal) components described in the Strategic Plan.
- **Contextual relevance:** alignment with health and sectoral policies and the health and digital health context.
- **Actionability:** translation of the strategy into an implementable action plan.
- **Governance:** mechanisms foreseen to steer and monitor the implementation of the Strategic Plan.

The first two dimensions, “Internal coherence” and “Contextual relevance”, relate to the formulation of the eHealth strategy document while the two second, “Actionability” and “Digital health governance”, relate to the implementation of the strategy.

The peer review process has been developed in two phases:

- Phase 1 (October-November 2024): Exchange with the Rwanda counterparts and review of complementary documents to ensure a correct understanding of the national health context and the current eHealth implementation.
- Phase 2 (January-February 2024): Detailed review of the Rwanda eHealth Strategic Plan and provision of comments and recommendations to improve internal coherence, contextual relevance, actionability and digital health governance.

A touching point with representatives of the Ministry of Health Technical Committee has been foreseen at the end of each phase to review and explain its results and clarify what is necessary.

A draft of the final report will be provided at the end of the second phase and will be open to one final comment and change request iteration. The final report will be submitted not later than 5 working days after having received these comments and change requests. Reviewers will be available to present the final report at the occasion of a virtual workshop within two months after its delivery.

The final version of the report will be owned by the Ministry of Health or the WHO Country Office, and EHTEL reserves the right to publish an article reporting on the peer review process.

2 Strategy coherence

Strategy coherence has been assessed vertically and horizontally. Reviewers have first look at the alignment between the different sections of the eHealth strategy and how they connect among them (i.e., vertical coherence). Then, the focus has moved towards how the strategy and actions related to the three eHealth components described in the Strategic Plan - services, infrastructure, and data – interact (horizontal coherence).

2.1 Vertical coherence

The National eHealth Strategic Plan 2023-2028 is structured following international good practice standards, and the different sections are well adapted. Vision, mission, and strategic objectives are preceded by a thorough situation analysis where the ongoing strategy is evaluated. Strategic initiatives are well grounded in the strategic objectives, and they are described and assembled in the High-Level Action Plan and in the Monitoring and Evaluation section.

While eHealth cannot be considered as the solution which will solve alone the many challenges faced by the Rwanda health system and as a substitute to the necessary changes due to support a global “one health” paradigm shift, it provides nevertheless important opportunities and enablers to tackle several challenges. This is particularly relevant when the solutions proposed are not competing with existing practices but are tapping needs which were not or were poorly addressed.

As mentioned in the Health Sector Strategic Plan 2018-2024, the (health) sector is now at a cross-roads, as it is facing the challenge to **sustain the current level of service provision**, while responding to: (i) the significant reduction in external financing; (ii) the change from mainly infectious diseases in the younger age-groups towards increasing numbers of non-communicable diseases often in older age groups; (iii) the increase in more costly secondary/tertiary care facilities/equipment; and (iv) disparity in lifestyle related morbidity and mortality patterns between urban/rural populations. One also need to pay particular attention to specific constraints related to the human resources: “outstanding challenges remain the gaps in skills mix; a high staff turnover and limited career development opportunities for health professionals at different levels of the health sector.”

Although Rwanda has a developed health infrastructure, accessibility to health services remains an issue for certain areas or for specialised services including emergency services. One also notes the mention of a weak pharmaco-vigilance system and limited capacity of supply chain management at different levels although Rwanda Medical Supply Limited operates an integrated health commodities supply chain.

When considering specific **communicable diseases** very significant progress has been made. However, specific attention needs to be remained paid to **malaria**, noted in the 2020-2024 malaria plan: “By 2024, strengthen surveillance and reporting to provide complete, timely and accurate information for appropriate decision making at all levels. Likewise, the plan refers to the need to “Introduce HIV self-testing and design innovative approaches to target adolescents.”

The plan also insists on the need to launch innovative approaches for the primary and secondary prevention of **non-communicable diseases** (NCDs) with a specific focus on:

- Introducing NCDs self-screening test (diabetes, high blood pressure...)
- Improving dermatology, ophthalmology and ear/hearing services
- Establishing an effective monitoring mechanism for the follow up of Sexual and Gender-based Violence victims (especially in social reintegration)
- Considering the use of technology for mental health service delivery

Family Planning remains a domain to be further reinforced with the need to “introduce a community peer education system to promote the continuous use of long acting and permanent methods of family planning services and emergency contraceptive”.

Many of the challenges and priorities mentioned here above can be effectively supported by patient-centred digital health technologies, **even in the absence of a fully mature digital health infrastructure** provided that the solutions selected can **evolve and be progressively integrated in the national eHealth infrastructure** with a particular focus on security and interoperability. The solutions which fit into this category are mostly related to prevention, chronic conditions management and rehabilitation.

2.2 Horizontal coherence: services, data and infrastructure

The National Health Plan 2018-2024 mentions the need for: **“Improving data management and use at all levels; improving reporting rate from private health facilities; linking and ensuring interoperability of all information systems as well as strengthening the health research systems for evidence-based policy and decision making”**. The statement indicates the importance of data quality and support for multiple use of the data. Interoperability of information sharing between health facilities, research systems, policy making, and other relevant decision-makers in healthcare demands strong dedication on pervasive data stewardship. Data consumer needs shall be mapped back into healthcare processes, data capture and data management platforms.

According to the assessment of the outgoing strategy based on the stakeholder interviews, there were several obstacles on the way of implementing the strategy. The new strategy promises to take the obstacles into account. The summary of the obstacles is that the healthcare facilities digitalization is held back by the insufficient internet connectivity, unreliable power supply, inadequate server infrastructure, limited financial resources, and low digital literacy. The respondents brought out also issues with governance, they don't see a clear governance structure. This may be a cause for inadequate coordination, effectively disabling the seamless flow of data from the point of capture to the data consumers and decision-makers. Disrupted flow of data leads to duplication in data capture and low (often single) use of the captured data. This duplication certainly leads to a reduction of the actual and perceived value of one's work. As the assessment points out, there is resistance to the adoption of digital health solutions.

The new strategy documents a list of challenges from the stakeholders' viewpoint. From the perspective of this review, few of the problems are worth to be prioritized for improvement:

- **Health data reporting is delayed due to data quality issues and staff turnover.** The delay can be observed on the webpage of the Ministry of Health, which reports key health indicators from 2015¹, i.e., 9 years back from the time of this writing. Though, it must be mentioned that there are reports from the later periods available through the webpage as well.
- **There is limited quality and quantity of human resource for digital health at various levels.** The remark does not say exactly how the resource for digital health is distinguished from the general healthcare workforce. However, one of the indicators demonstrating the issue is the overview of staffing of the Digitization Directorate. The unit is a central coordinator of the digitalization of the sector. It has a staff complement of 15, with just one analysis professional, while the rest of the unit is comprised by technical IT staff.

¹ Key Health Indicators by Ministry of Health Rwanda <https://www.moh.gov.rw/publications/key-health-indicators>

- **Data for registries is captured on paper forms which affects quality and digital completeness.** The reporting forms are published on the Ministry of Health website^{2,3}. Paper-based reporting is a clear indicator of disrupted data flow. Filling in any secondary data reporting form, paper-based, web-based, app-based, is duplication of data capture. Wide use of new capture for secondary use, may be a sign of limited interoperability.
- **EMRs of health facilities are not integrated for patient management.** The respondents brought out that the systems are mostly stand-alone type, with limited integration and interoperability. For the patient-centred healthcare, clinical decision-making depends heavily on the quality of the available information. Data quality is defined through many aspects, including completeness, timeliness, integrity, comprehensiveness, etc. Lack of good quality data sources for decision-making is a cause for extra work, indecision, or poor quality of decision. A question arises, if implementation of a set of new patient-facing systems would increase or decrease patient-centricity. Integration of the EMRs and improvement of the quality of data is a strong contributor to patient-centricity.
- **Digital health projects suffer from limited funding and over-reliance on donors.** It is also brought out that the health tech units are not institutionalized well-enough, the coordination needs strengthening, the digital health teams are stretched, and capacity of both central and local teams needs to grow. The remarks indicate the difficulty in evolving from project-based to institution-based maturity. Effective and efficient digitalization shall be almost seamless to the participants, the systems shall work with great availability, there shall be no extra efforts due to duplicate / secondary capture of same data, and information needed for decision-making shall be delivered to right location at right time. These benefits cannot be collected without a proper pervasive data stewardship, data custodianship, and IT service management. The strategy shall enable institutionalization of central and local digital health services.
- **Monitoring and evaluation of the digital improvements is not well implemented.** The bottom-up section of the new strategy lacks quantitative inputs about the existing digital health ecosystem. As for a patient-centric treatment there is a need for evidence-based diagnosis, the digitalization of healthcare delivery would benefit from systematic surveillance. The reported obstacles of implementation of the outgoing strategy and the challenges reported by interviewees shall be balanced by quantitative indicators of data quality and IT service quality. It would be useful to take a healthcare performance measure and demonstrate the effort of collecting the source data for its calculation. For example, how many times the input data for the cost per patient indicator needs to be manually processed in Rwanda.

Recommendations

- Define the indicators of end-to-end data flows from the data capture to multiple usage (home, clinical, management, policy, research, funding). This will make the benefits of digitalization visible for all stakeholders.

² Ministry of Health Publications / Health Data / District_Hospitals_HMIS_Reporting_Form.pdf
<https://www.moh.gov.rw/publications>

³ Reporting forms list: <https://www.moh.gov.rw/publications/health-data>

- Nurture the marketplace of digital health solutions by defining policies of funding, integration, interoperability, data security, certification, and usability.

The new strategy focuses on the benefits of patient engagement. Patient engagement is a very important aspect of healthcare. The strategy stresses the self-service as a vehicle for patient engagement to be enabled via AI-backed chatbot interfaces and integrated records management from the patient perspective. This is a bold vision, and it provides clear benefits in the long run. However, in the current situation of the country, as far as it is possible to understand it from the bottom-up section, the self-service interface may end up as another stand-alone data island, introducing additional burden of data management to the healthcare services. In reviewers' opinion, there is a need for balancing the idea of advanced self-service environment with a set of clear goals of healthcare process improvement. Otherwise, there is a risk of overinvesting into sophisticated patient-facing software systems and infrastructure without a real healthcare service behind it.

The vision of the strategy is "One Patient: One Record". This vision indicates the need for a defined and managed National Health Data Space, an ecosystem of policy, governance, standards, stakeholders, technology, and infrastructure enabling an efficient sharing of common records. To analyse the elements of the strategy the proposed solution can be mapped to HL7 FHIR levels and modules⁴.

- **Level 1 – Foundation.** The policy and implementation should enable a space of shared and proprietary services and infrastructures. The document brings out that the Health Information Exchange (HIE) implementation is still under its way. This should be a priority since implementation of HIE is a foundational decision that enables integrating different health apps and EMR systems into the National Health Data Space.
- **Level 2 – Metadata.** The policy and implementation should set up a pervasive stewardship organization to define common resources for conformance, terminology, security, and exchange of messages. There should be an open repository of healthcare data and data sharing standards. The action plan implementing the strategy should enable proper metadata management solution to emerge.
- **Level 3 – Master Data.** The policy and implementation should enable commonly accessible registries of patients, professionals, organizations, services, accounts, medications, devices, supplies, substances, etc. It is the task of the national data steward to coordinate interoperability of the master data registries. There is lack of clarity about the current state of specific plans regarding the master data in the new strategy.
- **Level 4 – Operational Records.** The policy and implementation should define shared records of clinical, diagnostic, medication, workflow, and financing. Current content of the strategy document indicates that the records are not yet interoperable and the record management across the borders of the digital health systems is largely manual.
- **Level 5 – Knowledge Records.** The level 5 should be about standardization of the data that carries machine readable knowledge and analytical indicators that can be used for automated clinical reasoning, evidence research, and defining medication. It is the level 5, where an AI solution becomes safe to implement in a healthcare setting or supporting patient engagement.

⁴ HL7 FHIR, a standard for health care data exchange. <https://hl7.org/fhir>

From the perspective of the HL7 FHIR levels, the strategy document should be complemented with an action plan that supports implementation of the national digital health system's data and infrastructure towards an integrated and interoperable ecosystem that would make the data sharing efficient. This efficiency may free energy for additional efforts towards advanced AI-based decision-making in healthcare.

Recommendation

- Increase the importance of HIE implementation.
- Establish clear responsibility and resources for data custodianship from data capture to data consumption.

The Strategic Plan allocates the responsibility for the interoperability of the systems to the Ministry of ICT (MINICT). This can certainly be a viable option for the health data and data standards to be stewarded under the MINICT. The Ministry of Health shall then coordinate the policy that supports enforcement of the standards by MINICT in the healthcare sector. It is a bit unusual, however, to build a competence of health data standardization out of the domain of Ministry of Health. Possibly the role of the national health data stewards should be clarified by the suggested legal means of the strategy.

The strategy highlights the role of the Data Governance Committee in the segregation of duties between oversight and execution to eliminate conflicts of interest between Data Governance and Data Management. The role of the committee should be extended with a permanent body of national health data stewardship.

The digital health terminology, standards, governance, and patterns of IT solutions introduced in the document of the new strategy are all very relevant.

Recommendations

- Allocate responsibility for the pervasive data stewardship into a sustainable digital health governing institution (Data Governance Committee) with responsibility over the entire national health data landscape.
- Define the funding, mandate, and function of the national digital health competence centre under the jurisdiction of the Ministry of Health.
- Focus on the next step of implementing instead of reformulating the strategy.

3 Contextual relevance

This section analyses the contextual relevance of the eHealth Strategic Plan in terms of alignment with the health strategy and other sectoral and governmental strategies. It also evaluates the alignment with the broader health system context, including the digital health ecosystem in Rwanda.

3.1 Alignment with the health strategy

A commitment to achieving Universal Health Coverage is reflected in the fourth Health Sector Strategic Plan 2018-2024 (HSSP IV)⁵ in line with the United Nations (UN) Sustainable Development Goals (SDGs) and the realization of the target 3.8 “achieving universal health coverage”, and the Vision 2050 “universal access to high quality healthcare”. Ensuring **universal accessibility to quality health services** in both geographical and financial terms is a key contribution of the eHealth strategy, especially for remote areas, making services more accessible, affordable, efficient and of high-quality. This contribution was initiated in the first digital health strategy.

Besides increasing access to quality healthcare, the alignment of the eHealth Strategic Plan is materialised in the adopted **patient-centric and patient empowerment** approach that percolates in the strategic initiatives. Table 2 “Alignment of the patient-centric digital health objectives with the UN’s SDGs” shows how digital health strategic objectives 2023-2028 align with UN SDGs. Besides SDG 3, the digital health strategic objectives are aligned also to SDGs 4 (Quality education), 10 (Reduced inequalities) and 16 (Peace, justice and strong institutions). Moreover, the alignment with the WHO Global strategy on digital health (2020-2025) recognises that digital technologies are a critical pillar and an enabler of **sustainable health systems**.

From a technology perspective, the eHealth Strategic Plan aligns with the current National ICT Sector Strategic Plan (SSP) 2018-2024 and Smart Rwanda Masterplan. The National ICT SSP commits to SMART Health with Zero Trip and Zero Paper programme through digitization as one of the vehicles to spur **social economic development**. The African Union Agenda 2063⁶ affirms that “it is essential to maximise the power of ICT as a true enabler of socio-economic development”. Rwanda reaffirms this approach to attain long-term goals such as the UN’s Sustainable Development Goals (SDGs). Concerning the Smart Rwanda Masterplan, the strategy prioritises the use of telemedicine to increase access to health services, provide better experience of care, reduce waiting times and be more efficient, as presented in Figure 1 “Alignment with the Smart Rwanda Objectives, Benefits and Focus Areas”.

Recommendation

- Identify the coverage of the eHealth Strategic Plan with the health objectives set forth in the HSSP IV and health sector sub-strategies. This alignment will reinforce the patient centricity strategic driver for specific health conditions.

⁵ Republic of Rwanda Ministry of Health (2018). Fourth Health Sector Strategic Plan 2018-2024: <https://www.moh.gov.rw/index.php?eID=dumpFile&t=f&f=25999&token=ed64a48ec308901591d77d78816faf67ce888b64>

⁶ Agenda 2063: the Africa we want (2015). https://au.int/sites/default/files/documents/36204-doc-agenda2063_popular_version_en.pdf

3.2 Alignment with the health system context

In epidemiological terms, a comprehensive description of the health system context hasn't been provided. Neither is the description of the health system organization including the number of health facilities, health workforce or medical equipment. Therefore, the alignment with the health system context relies in the linkage with the health priorities and goals contained in HSSP.

The alignment between the health and eHealth plan is illustrated in Figure 3 "A summary of the approach taken to developing the digital health strategy". Patient centrality is presented as the main glue which links the two plans. This is certainly a valid assertion but to operationalize the plan, it should be important to refer directly to a few priority domains listed in the HSSP IV or health sector sub-strategies (eye health; surgical, obstetrics and anaesthesia; ear and hearing; health financing; emergency medical services).⁷

All strategic objectives and initiatives are linked to patient outcomes, health sector patient value proposition and patient benefits. It is worth noting that the Strategic Objective 5 "Enhance the management of chronic diseases by enabling remote monitoring and support" targets specifically NCDs given the increasing burden of disease in the country.

To explore the specific context of digital health in Rwanda, an external literature review was conducted by the authors of the eHealth strategy. Digital health and mHealth challenges are presented respectively in Table 3 "The nature of digital health challenges in Rwanda" and Table 4 "The nature of mobile health challenges experienced in Rwanda". Although the literature review is limited to three references, this exercise helps to analyse how the strategy is addressing the main eHealth challenges the country is facing. All challenges are entirely or partially tackled.

A key component of the health system context is the description of active and under development eHealth services. Section 3.7 "Services and applications situation" provides an overview of 9 digital health tools and health information systems under the Ministry of Health supervision. However, to better describe the digital health situation, two elements should be added. On one side, a quantitative view of the current eHealth services describing the number of users and transactions as well as the geographical or functional coverage. On the other side, a complementary information about the digital health services provided by private institutions that are part of the health system.

References to international good practices are presented in relation to the digital health strategy (Estonia, Finland, Israel, Singapore and South Korea), the patient outcomes approach (UK, Denmark, Sweden and Australia), the EHR strategy (Denmark, Estonia and Finland) and the eHealth services maturity (Luxemburg, Estonia and Malta). However, there are no references in the domain of health data strategies and the development of health

⁷ Six health sub-sector strategies:

https://www.moh.gov.rw/publications?tx_filelist_filelist%5Baction%5D=list&tx_filelist_filelist%5Bcontroller%5D=File&tx_filelist_filelist%5Bpath%5D=%2Fuser_upload%2FMoh%2FPublications%2FStrategic_Plan%2F&cHash=036758f04282b3ad4ada3ca9f9b7619c

data spaces like the European Health Data Space (EHDS) despite the data strategy is a core pillar of the Strategic Plan.

Recommendations

- Improve the description of the health system context at epidemiological, organisational and technological level, providing geographical and functional information about the adoption and use of digital health services and including information from private operators.
- Include references to best practice in the domain of health data strategies and the development of health data spaces like the EHDS to support the actions proposed in the Data Strategy.

4 Actionability

In this section we focus on elements to consider for an actionable implementation plan to address those points related to the deployment of the strategy, mainly provided under sections 6 – Strategic Objectives and Initiatives and 7 – High level Action Plan. We also cover parts of sections 8 – Enabling IT and Data Strategies, and 9 – Monitoring and Evaluation.

4.1 Making the strategy actionable

The situation analysis provided by the report remains quite general as no concrete Key Performance Indicators (KPIs) were provided. In particular, it does not succeed to provide a clear overview of the baseline, i.e., the current **state of use** of the different digital tools deployed in the country. It is limited to a general description of the existing tools and their intended purpose. It also does not provide a benchmark of the **quality of the data** collected in the different domains targeted by the different tools. It would have been useful to have some indication of the level of maturity and use of the HIE such as, for example, the number of patients for which information is shared, types of documents shared or type (and number) of healthcare professionals' users.

As also mentioned in the close-out report, the fact that the stakeholders consulted are representatives of public official bodies and administrations (the report refers to “district stakeholders”) and donors is an important limitation as it does not capture the perspective of the different actors active in the health value chain, which proves essential to make the strategy actionable. It cannot thus be taken for granted that the figure 8 which summarises the vision for the future situation is both understood and validated by the different actors.

The SWOT analysis provided in section 4 identifies under threats and weaknesses a number of critical factors to be addressed: aside from aspects related to funds availability, infrastructure and legal/regulatory elements, resistance to change, digital literacy and geographical disparity are rightly identified as elements which require specific action plans. Human turnover is also identified as an important factor which will directly influences operational strategies. The findings listed under section 3.9.1 provide a more detailed list of the challenges faced.

One of the statements made under section 3.6 claims that “**HIE integration is executed without disrupting existing digital health solutions**”. While this statement is important to gain support from current users and developers, development of HIE infrastructure has often had major impact on existing systems and market consolidation. An efficient and meaningful HIE requires a deep review of the EHRs systems with a focus on data, functions and services. It is thus advisable to rather speak of an “iterative adaptation process” governed in such a way that all actors can take appropriate actions (and decisions) in a mutually accountable ecosystem.

The many KPIs proposed under section 9 – Monitoring and Evaluation are sometimes specific but often general and not always easy to characterise and contextualise. Many of them do require to have a very good understanding of the baseline situation, which is a difficult objective. Furthermore, the acquisition of monitoring data is in itself strongly connected to the development of the infrastructure and the services which does not happen overnight. It is thus important to develop the KPIs in such a way that they are closely connected to each project/service lifecycle development.

Recommendations

- Compile information about the baseline situation to allow the monitoring and evaluation system to show progress and deviations.
- Develop KPIs closely connected to each project/service lifecycle development.

4.2 Towards an operational strategy

4.2.1 Stakeholder engagement

Experience gained in many countries show that **different drivers** need to be **combined and aligned** to gain users' adherence to a national digital health action plan. Furthermore, one should be aware that a substantial difference exists between **use** and **meaningful use**, which in the end is the condition to create added value. It is only when different **external and natural drivers** are combined that a true take-off can take place. **Natural drivers** are related to direct interactions between users (such as for example a clear demand for a service and data) or to specific interests of the users (such as for example the willingness of a clinician to be associated to studies) while external drivers (financial, legal, educational, certification, promotional...) require proactive actions from public authorities.

When considering the different elements listed as incremental requirements of leadership and governance; investment; legislation, policy and compliance; workforce and talent; infrastructure; standards and interoperability; and services and applications in the document, it is important to identify the different stakeholders (considering here in particular the services providers) and classify them against a set of criteria (early adopters, influencers, supporters, opponents) and use the different available drivers not at the same but the right time.

Recommendation

- Establish political drivers and policies based on the classification of end-users of digital health services into adoption categories from early adopters to opponents, increasing implementation effectiveness and timeliness and reducing resistance to change.

4.2.2 Stakeholder adoption

The different systems currently used in Rwanda are listed in section 3.7 Services and Applications Situation. They fulfil different purposes and do require different sets of data from users. One of the main resistances to change is related to the persistence of silos where actors have to repeatedly enter partially identical data in different systems. The so called **"only once"** strategy where original data are produced as much as possible on the point of care and can then be reused for different purposes is thus also an important adoption enabler which do require important orchestration and governance efforts from the actors developing those systems. The adoption by the Ministry of Health of an advanced version of OpenMRS called Bahmni, currently being customized and planned to be scaled out to all facilities as a full-scale EMR should be considered as the **foundational building block** on which the "only once" strategy can be built. It would also allow to apply and deploy the chosen interoperability standards in a very consistent and efficient manner.

The value proposition related to patient centricity is described with clarity from the patient perspective, but some elements are missing to decline it in an operational strategy. A difference should be made between what is perceived as **"needed"** versus what is **"wanted"** while the main **"fears"** should also be taken into consideration. This should be further apprehended through dedicated sessions with different clusters of patients/citizens (age, gender, education, medical - including handicap - and geographical conditions). As two of the strategic initiatives propose to deliver services digitally through virtual encounters, a list of the preconditions to be met to ensure acceptability is truly useful. Using "personas" to better characterise interactions between humans and digital services has proved very straightforward in this regard. Practical examples can be found in the EIP on AHA

Blueprint Personas.⁸ The younger population could also be targeted as direct ambassadors/facilitators of the services in their family environment.

Proposed initiatives to support health literacy and feedback need also to be calibrated. Patients and citizens are used to consult many sources of information. The priority could be given to services and content which clearly engage citizens (such as an integrated care pathways or major health issues for which there is a massive demand of information) and connected to a benefit for the citizen. The “online” availability of education and training resources has not always proved to be highly effective in achieving the goals if this is not connected to processes which include human interactions.

It is thus important to identify champion “services” which will receive immediate and wide support such as appointment booking for rare services for example. If those services are accepted and used, it will be much easier to promote additional services.

Recommendations

- Adopt an “only once” strategy where original data are produced on the point of care and can be reused for different purposes. The adoption by the Ministry of Health of an advanced version of OpenMRS called Bahmni should be considered as the foundational building block on which the “only once” strategy can be built.
- Co-design services with different clusters of patients and using “personas” to better characterise interactions between humans and digital services.

4.2.3 People’s trust

Considering legal compliance, **informed consent options are closely linked to the level of trust existing in the community**. Citizens from Scandinavian countries have usually a high level of trust in public bodies and administrations. Deciding to select an “Opt-in” or an “Opt-out” strategy is thus highly dependent on this level of trust. An Opt-in strategy is usually first selected when this relationship of trust cannot be taken for granted even if it has consequences on the roll-out. A too early Opt-out strategy might indeed have a long-lasting negative impact especially if literacy remains limited. It is thus important to try not to bring unneeded complexity and keep information as simple as possible but to accept to take the time necessary to install trust in the community. The same goes when discussing access and control rights. Defining very granular rights for the different categories of healthcare professionals seriously increases the level of complexity and should thus only be implemented if this is a condition for healthcare professionals to adhere. The idea that the HIE infrastructure is co-owned by healthcare professionals and not imposed top-down is usually a pre-condition for adherence.

Strategic Initiative 4 mentions a Portal for patients. Given current limitations (infrastructure, connectivity, skills etc..), it would be worth considering the development of a reference Patient App which would become the backbone of connexion of the citizen with the different services. As mentioned in page 63 of the strategy, Rwanda’s internet penetration was 26% in 2022, while mobile penetration was at 79% with 37.8% of the population having access to

⁸ EIP on AHA Blueprint Personas: <https://futurium.ec.europa.eu/fr/active-and-healthy-living-digital-world/library/eip-aha-blueprint-personas?language=en>

electricity. This would also allow the citizen to have access to critical data and resources even in absence of connectivity. **Indonesia** can be considered as a good example in this regard with 112 million users of the national health app which focuses on the most wanted functionalities and follows a pragmatic and unambiguous approach. The App used Covid-19 as a starting point and has been adding progressively additional services.

Recommendation

- Develop a reference Patient App which could become the backbone of connexion of the citizen with the different services.

4.2.4 Capacity building

The actions presented under section 6.8 to develop capacity building are described in great details and represent well the panel of initiatives which can be undertaken. Experiences in other countries show that many of those activities are usually better performed when they are **delegated to an independent entity** which can make full use of the experience and motivation of the early adopters.

It is also essential that the products and services have reached a sufficient level of maturity before engaging into capacity building activities which – as proposed – must always have a hand-on component. Once the services are ready, it can take usually up to 5 years to cover the majority of the targeted healthcare professionals. One has also to remember that any training which is not followed by actual practice in the weeks which follow the practice is usually lost and needs to be repeated.

Thus, it is advisable to develop the capacity building activities in a stepwise manner focusing first on awareness and then on actual use of products and services. Many countries have also connected the capacity building activities to the curriculum of continuous training of healthcare professionals (and thus linking it to the maintenance of their professional certification). The proposed initial assessment of digital skills is an absolute pre-requisite given the wide variety of situations in Rwanda. Initiatives to target the groups which do not own the basic digital needed skills could be taken without further delay.

Recommendation

- Develop capacity building activities in a stepwise manner focusing first on awareness and then on actual use of products and services and eventually connect capacity building activities to continuous training certificates.

4.2.5 Infrastructure

As far as financing is concerned, the **maximum reuse of existing mature e-Gov components and the generic and agile nature of the infrastructure** has a major impact on initial investment costs. When major investment costs are progressive and shared between several institutions, the budgetary structural adjustments are usually easier to absorb. Aside from the basic transversal services, some heavier investments such as the advanced version of OpenMRS, the national patient App or the necessary reference databases are deemed to provide the basis for a virtuous take off.

The hybrid federated architecture proposed is indeed best suited to accommodate scalability needs. While major healthcare organisations such as large hospitals can be considered as data lakes, this not the case for a huge majority of users. Hence, information to be made available within the HIE needs to be stored in “safes”: it is advisable to limit the number of those safes to enforce trust and ensure the participation of end-users (through e.g. professionals unions) in their governance.

The reliance of **trusted databases** (referred to in the document as central repositories although shared EHR is of a different nature) is an important aspect to ensure security, traceability, auditability but also interoperability. Currently repositories for healthcare providers, clients and facilities are listed. Other databases with important added value could be considered to support the global ecosystem such for example data related to mandates. Most importantly, the availability of a **central trusted database for Medicinal products** which would provide to all systems the attributes, values and identifiers needed is due to provide a high added value, solve the issue of interoperability of Medicinal products at national level and support regional and global use cases.

The report provides a selection of the most widely known standards and initiatives to support interoperability, but this is of course in constant evolution, and they only represent a sample of the standards currently developed and used in different domains. Some standards like SNOMED CT need to be added to the list. The focus on data (and data reuse) triggered by AI technology has brought new interest for initiatives such OpenEHR⁹ which is increasingly being referred to as an important enabler to allow smart reuse of data produced by EHRs. When selecting standards, it is essential to consider both their maturity and scalability but also their capacity to be part of a wider ecosystem which considers other use cases than the ones they have been created for, avoiding thus to adopting countries expensive cross-mappings operations: many standards allow the production of local extensions to comply with national requirements but keeping track of international evolutions remains challenging. Hence the need to keep track of those local extensions and monitor international evolutions. This is particularly true for HL7 FHIR. As mentioned under section 6.7, the use of metadata to characterise the different data sets available is becoming increasingly important to make full use of those data. New standards are also being developed to support this goal such as the Data Catalogue Vocabulary Application Profile (DCAT-AP).¹⁰

When interacting with the industry and beyond the proposed sandbox to support innovation, the organisation of “labs” (or national *connectathons*) will allow to test and validate the use of selected standard-based specifications. The organisation of these labs, ideally under the supervision of the Digital Health Enterprise (DHE), is also an excellent method to identify issues and improve the specifications. When dealing with systems already in operation, it is also advised to provide them with a minimum of predictability. Objectives, specifications, testing and validation processes, and iterations need to be announced well in advance to allow each company to proceed with the necessary adjustments. Given the limited number of EHR products in circulation in Rwanda, this should not be a big issue, but the same remark applies to other products possibly available on the market (specific apps, telemonitoring etc...).

When selecting products off the shelf, it is advised to first make use as much as possible of the expertise available through organisations such as ORCHA¹¹ which has developed partnerships with several states which can proceed with a pre-selection against a wide set of criteria pending the expanded use of an internationally recognised quality

⁹ OpenEHR: <https://openehr.org/>

¹⁰ DCAT-AP: <https://joinup.ec.europa.eu/collection/semic-support-centre/solution/dcat-application-profile-data-portals-europe>

¹¹ ORCHA: <https://orchahealth.com/>

label for mobile health apps. Once selected, product owners can be approached with specific adaptation/validation requests, including connexion with the national HIE infrastructure. However, in the case of Rwanda, and as already mentioned before, pending the availability of a wide internet connectivity, specific selection criteria might apply which will reject solutions which would otherwise have been selected or would require substantial adaptations.

As for applications and devices which are classified as sensitive, reliance on, for example, CE marking is a preliminary condition.

Recommendations

- As far as financing is concerned, it is advisable to re-use existing mature e-Gov components.
- When selecting standards, it is essential to consider both their maturity and scalability but also their capacity to be part of a wider ecosystem which considers other use cases than the ones they have been created for, avoiding thus to adopting countries expensive cross-mappings operations.
- When interacting with the industry, the organisation of “labs” (or national connectathons) will allow to test and validate the use of selected standard-based specifications. When dealing with systems already in operation, it is also advised to provide them with a minimum of predictability.
- When selecting products off the shelf, it is advised to first make use as much as possible of the expertise available through organisations such as ORCHA to proceed with a pre-selection against a wide set of criteria pending the expanded use of an internationally recognised quality label for mobile health apps.

4.3 Towards SMART objectives, achievable by 2028

Section 7 advises to begin in 2024 with the foundation elements, then move to enhance and build on those components, and then optimise those developments. Figure 13 seems to suggest that most of the foundational elements might be ready within a year. In our views, this does not seem realistic given the complexity and the cost of some of the initial investments to be made. The possible time frame for the actions presented under foundation and excellence is not defined per se and there is no clear match between the actions and the time frame presented under figure 13.

One needs to consider that general awareness about eHealth is usually quite limited at the beginning. When existing, it is limited to very basic set of general considerations. This is true for all the actors of the value chain including public administrations. The initial launch of an eHealth journey usually relies heavily on a limited community of early adopters and technicians who will provide the support for the creation of the initial IT backbone infrastructure. To achieve quick results, the initial governance is thus usually infrastructure oriented, agile and relatively light-weighted. However, once the question of actual use of the services is on the agenda, a more complex governance structure needs usually to be installed as it requires the buy-in and the concrete engagement of all the actors of the value chain.

Many countries or regions heavily underestimate the efforts needed to create the “enabling environment”. It should be carefully prepared as it usually involves complex and long processes.

SMART goals, objectives or indicators are those that are **Specific, Measurable, Achievable, Relevant, and Time-bound**. Defining goals objectives and indicators following the SMART criteria help to ensure that they are attainable within a certain time frame.

Aside from the key transversal building blocks to be developed by the DHE which are needed in all cases and are managed through a specific governance process, more preliminary work is needed to transform the high-level action plan into an operational action plan. Although this is not the first Rwanda eHealth action plan and considering its substantial ambition and close link with the priorities of the Health action plan, it is advised to organise during the first part of 2024 a wide stakeholders consultation through roundtables with an invitation to all representative associations and initiatives of the Rwanda Health value chain, including thus key public bodies, hospitals, professional unions, research units, mutuality's, industry, etc... The main objective of this consultation would be to validate **SMART** (specific, measurable, achievable, relevant, and time-bound) concrete objectives and, most importantly, **agree on the governance bodies and processes** (cross-cutting issues).

It is essential that for each operational objective (connected with one of several strategic initiatives) one project owner is clearly designated. To guarantee that the same methodology is applied for all actions to be debated, it is also advised to use the same animator for all the sessions. Depending on the complexity of the actions to be discussed, one or two sessions of 2 hours per action should be foreseen.

For each action, a story using representative personas, could be prepared by a small number of highly involved people to help the participants to project themselves into the "to be" situation and compare with current situation. It is important that **only actions which can be undertaken under the proposed timeframe (2024-2028)** are discussed.

For each proposed objective, the following aspects should be covered: project ownership, start time, specific objective, and problem statement (as is), actions foreseen (and already implemented if relevant), impact on systems and business, dependencies (technical, legal, financial), feasibility demonstration, proposed implementation calendar, means of verification and measurable KPIs.

The first and most important result of this intense exercise is to create the conditions for a wide appropriation of the action plan. Once the first consolidated action plan is created and the corresponding governance mechanisms installed, the regular update of the action plan is then greatly facilitated, and each specific objective can regularly be completed and updated.

It seems also clear that not all regions of Rwanda present the same development opportunities given current infrastructure (electricity, connectivity) and human limitations. In order not to be able to pilot the implementation of priority services, it might seem relevant to focus first on the regions and organisations which meet the necessary pre-conditions for deployment and then planning a progressive national roll-out as conditions develop.

One has also to be aware that it remains difficult to quantify the real benefits of digital health implementations although there is ample evidence of its contribution to the one health strategy. In many instances, non-clinical parameters (such as patient satisfaction, Quality of Life, etc...) are used to demonstrate progress but in most cases, the objective demonstration of Return-on-Investment faces complex limitations due to the number of factors at stake. When describing the actions, it is thus also important to describe clearly all the **assumptions made** concerning this value creation.

On the basis of the information made available through the final report and the informal discussions with the Ministry of Health core team representatives, it seems also possible to **identify a number of quick wins**, focusing thus on priority on well perceived uncovered health needs where there is a high immediate potential of patient engagement and mature solutions available on the market. Likewise, a national patient facing App could be deployed with a first set of core functionalities (to be validated during the roundtables) provided it is compatible with the national interoperability roadmap.

Resistance to change with healthcare professionals is significant and even in presence of mature products, progress is usually slow. Several types of **incentives** need to be combined to observe real take-off. Activating

digital initiatives which can make a real difference for the citizens even without direct support from healthcare professionals would thus allow to create societal value and contribute to a much-needed adaptation of the roles in the health system.

Recommendations

- Review the time frame for the set of actions considered foundational.
- Stimulate a wider appropriation of the action plan by conducting a validation process of well-defined SMART objectives and agree on governance bodies and processes.
- Identify quick wins focusing on well perceived uncovered health needs where there is a high and immediate potential of patient engagement and mature solutions available on the market.

5 Digital health governance

This section focuses on the steering and oversight of the digital health strategy implementation. We assess how the function of governance is described in the strategy and how it connects with the existing governance bodies, reflecting on roles, responsibilities and processes.

5.1 Governance to implement the strategy

In the situation analysis, the current governance structure is briefly described and assessed along the outgoing strategy. The description is limited to the public organizational chart of the Ministry of Health and relevant relationships with external national agencies (e.g., Rwanda Biomedical Centre, University Teaching Hospitals, etc...).

Lessons learned related to strategic actions to implement the first National Digital Health Strategy 2018-2023 are captured in the assessment of the implementation performance presented in Figure 5. The component “Governance, policies and standards” is on track, but it does not reach the level of full institutionalisation. According to this assessment, improvements were noted in the development of strategic documents and guidelines; improved patient experience; disease surveillance; supply chain management; health information management; and planning and decision making. However, “Capacity building and HR for eHealth” was reported well below optimal.

It is worth noting that the suboptimal performance of the implementation of the previous strategy is partially due to **“an unclear governance structure and inadequate coordination and engagement of stakeholders in the Digital Health Strategy implementation at different levels of the health system”**. The Strategic Plan recognises these deficits around roles, responsibilities and processes, and claims that all are addressed in this new strategy.

Sections 6.5 Supporting leadership and governance requirements, 6.6 Supporting investment requirements, 6.7 Supporting legislation, policy, compliance, auditability and ethics requirements, and 6.8 Supporting workforce and talent development requirements, provide answers on how the new strategy addresses the governance gaps identified in the implementation process of the former strategy.

Specifically, section 6.5.1 defines the digital health governance adopted by Rwanda and based on Health Ministry model where the Ministry of Health “drives digital health and mobilises technical capacity and skills from other ministries, agencies, firms and organizations to deploy digital health systems.” Terms of reference, accountabilities and practices of each key stakeholders are introduced including four governance bodies:

- **National Digital Health Governance Committee (NDHGC)**: composed by the Ministry of Health, MINICT, the Ministry of Local Government, Ministry of Finance and Economic Planning, TWG, Development partners, Healthcare providers, Private sector.
- **Digital Health Technical Working Group (TWG)**
- **IT Governance Committee**
- **Data Governance Committee**

However, the composition or the mechanism to nominate the members of the TWG and the IT and Data Governance Committee still need to be specified.

One important risk when developing an ambitious digital health plan is to create from the start governance mechanisms which are not calibrated to the level of development of the infrastructure and services at a particular moment in time. This can quickly become a burden. To mitigate that risk, it is important to **separate the DHE from the different specific services to be developed**. The DHE focuses on the essential infrastructure and basic transversal services essential to any deployment. It needs thus a certain stability and an adapted governance

process. The DHE governance can ideally be supported by a technical “architecture” Working Group gathering the knowledgeable experts under the Digital Health Technical Working Group (TWG). It is especially important to identify at the beginning of the process individuals who benefit from a high level of trust in their milieu. The working group can both have an initiative and an advisory role to the DHE board. It is important that the budget and financing of the DHE is identified distinctively and that its management can benefit from a high level of independence. Considering the specificities of the human profiles required, the DHE also needs to be able to use flexible mechanisms to attract and keep them. Therefore, the DHE (IT) requires a board distinct from the management team.

The different representatives of the value chain need to be associated. It is also important to have a sufficient representation of the different healthcare professions and organisations aside from the different impacted administrations, ideally using for examples the different unions. Although they are not expected to bring technical input, it is essential to have their buy-in on cross-cutting issues and to use them for a reality check. Aside from the TWG, a stakeholder working group could thus have this role – although remaining in an advisory role. Additionally, if patient-centricity is at the heart of the strategy, mechanisms to incorporate the voice of patients should also be articulated.

Most of the proposed strategic initiatives will be developed as projects and hence will need to develop their own ad hoc governance processes. This should give each initiative the agility to progress swiftly. Each initiative needs however to be approved and aligned with the global strategy while interactions with components provided by actors not directly involved in the project need to be identified from scratch. Within the Ministry of Health, a “programme manager” could be elected whose role would be to ensure that cross-cutting governance principles are respected by all projects and prepare the decisions to be taken by the digital health board detailed under section 6.5.1.

Recommendations

- Identify mechanisms to institutionalise the strategic areas that include “governance, policies and standards”, “HIS and data management”, “Health Enterprise Architecture”, “eHealth financing and sustainability” and “Capacity building and human resources for health”.
- Separate the governance of the Digital Health Enterprise (DHE) from the different specific digital health services to be developed, lightening governance mechanisms.
- Increase participatory governance by incorporating a stakeholder working group, including representatives of health professions and the voice of the patients, as an advisory board.

In terms of data governance, aside from the recommendation to separate oversight and execution, it might be interesting to consider it from different angles, namely:

- **Data structuring and alignment** connected to interoperability with the objective of providing the necessary semantic resources (and mappings) to data consumers. This also requires aligning as much as possible the different existing data collection (registers) in order to reduce costs and increase efficiency. Those tasks require specific expertise which are usually gathered within a dedicated terminology unit. This unit would thus act as (semantic) data-source provider.
- **Data security aspects:** A specific independent body is already created.

- **Data use:** granting access to existing data in full respect of existing legislation for legitimate purpose. This is currently being developed in all countries as an independent entity. Its creation requires a specific infrastructure which can be prepared during current action plan but is only meaningful when a substantial set of normalised datasets are available.

The experience accumulated in the EU shows that a successful process to ensure a global governance includes the following aspects:

- The adoption of mechanisms for **approving and endorsing the vision** and ensuring that consultation and communication with stakeholders is well managed. This implies:
 - Having a formal political endorsement which involves all parties (competent Ministers and Public bodies and Administrations), an articulation aligned with the health priorities, and a structural funding of the roadmap together with a timeline.
 - Guaranteeing an interaction between decision-making and consultation bodies.
- The creation of a **core team with technical knowledge** and a **good interface** with end-users
- The configuration to allow **an appropriate and agile evolution** of the governance mechanisms.
- The existence in each governing body of **analytical ability and communication skills**.

Looking at the different functions that the governance mechanisms must fulfil, one may differentiate between:

- The activities related to global **oversight and steering** (involving mainly key public decision-makers).
- The activities related to **project management** (i.e., progress monitoring, financials, risk management etc...) devoted to **each entity responsible** for a component or a service.
- The activities related to **expert inputs on critical topics** (infrastructure, systems requirements, interoperability, creation of circles of trust, common rules for data exchange, GDPR implementation, cross-domains services, telecommunications, education and workforce capacity building, etc...)
- The activities related to stakeholder engagement and consultation with a particular focus on **key influencers and engaged stakeholders**.
- The activities related to **communications management with a particular view to broader stakeholders and the general public**.

It is usually not possible to have everything established at the same time and it is thus essential to invest first the resources and energy to build and articulate a common vision appropriated by all actors of the value chain and validated at political level. While governance needs thus to be considered as globally as possible, it is also often counter-productive to activate all the governance mechanisms at the same time. One needs to provide first the time and the opportunities for each cluster to build the necessary understanding and develop the basic competencies which will ensure a fruitful dialogue.

Recommendations

- Nominate a “programme manager” with the responsibility of ensuring that cross-cutting governance principles are respected by all projects and prepare the decisions to be taken by the National Digital Health Governance Committee.

- Improve data governance by creating independent bodies responsible for semantic interoperability, data security and data reuse.
- Invest first the resources and energy to build and articulate a common vision appropriated by all actors of the value chain and validated at political level.

6 Conclusions and next steps

After reviewing the National eHealth Strategic Plan 2023-3028 in terms of internal coherence, contextual relevance, actionability and digital health governance, the EHTEL reviewer team suggested 24 recommendations. 8 recommendations are addressed to improve the formulation of the strategy document and 16 recommendations are aimed at ensuring an effective and successful implementation of the Strategic Plan.

6.1 Recommendations to improve the eHealth Strategic Plan formulation

Internal coherence

Horizontal alignment

1. Allocate responsibility for the pervasive data stewardship into a sustainable digital health governing institution (Data Governance Committee) with responsibility over the entire national health data landscape.
2. Define the funding, mandate, and function of the national digital health competence centre under the jurisdiction of the Ministry of Health.
3. Increase the importance of HIE implementation. Establish clear responsibility and resources for data custodianship from data capture to data consumption.
4. Nurture the marketplace of digital health solutions by defining policies of funding, integration, interoperability, data security, certification, and usability.
5. Focus on the next step of implementing instead of reformulating the strategy.

Contextual relevance

Alignment with health system context

6. Identify the coverage of the eHealth Strategic Plan with the health objectives set forth in the HSSP IV and health sector sub-strategies. This alignment will reinforce the patient centricity strategic driver for specific health conditions.
7. Improve the description of the health system context at epidemiological, organisational and technological level, providing geographical and functional information about the adoption and use of digital health services and including information from private operators.
8. Include references to best practice in the domain of health data strategies and the development of health data spaces like the EHDS to support the actions proposed in the Data Strategy.

6.2 Recommendations to improve the eHealth Strategic Plan implementation

Actionability

Making the strategy actionable

1. Compile information about the baseline situation to allow the monitoring and evaluation system to show progress and deviations.
2. Develop KPIs closely connected to each project/service lifecycle development.

Operational strategy

3. Establish political drivers (financial, legal, educational, certification, promotional...) based on the classification of end-users of digital health services into adoption categories (early adopter, influencers, supports and opponents), increasing effectiveness and timeliness.
4. Adopt an "only once" strategy where original data are produced on the point of care and can be reused for different purposes. The adoption by the Ministry of Health of an advanced version of OpenMRS called Bahmni should be considered as the foundational building block on which the "only once" strategy can be built.
5. Co-design services with different clusters of patients and using "personas" to better characterise interactions between humans and digital services.
6. Develop a reference Patient App which could become the backbone of connexion of the citizen with the different services.
7. Develop capacity building activities in a stepwise manner focusing first on awareness and then on actual use of products and services and eventually connect capacity building activities to continuous training certificates.

Infrastructure

8. As far as financing is concerned, it is advisable to re-use existing mature e-Gov components.
9. When selecting standards, it is essential to consider both their maturity and scalability but also their capacity to be part of a wider ecosystem which considers other use cases than the ones they have been created for, avoiding thus to adopting countries expensive cross-mappings operations.
10. When interacting with the industry, the organisation of "labs" (or national connectathons) will allow to test and validate the use of selected standard-based specifications. When dealing with systems already in operation, it is also advised to provide them with a minimum of predictability.
11. When selecting products off the shelf, it is advised to first make use as much as possible of the expertise available through organisations such as ORCHA to proceed with a pre-selection against a wide set of criteria pending the expanded use of an internationally recognised quality label for mobile health apps.

SMART objectives

12. Review the time frame for the set of actions considered foundational.
13. Stimulate a wider appropriation of the action plan by conducting a validation process of well-defined SMART objectives and agree on governance bodies and processes.

	14. Identify quick wins focusing on well perceived uncovered health needs where there is a high and immediate potential of patient engagement and mature solutions available on the market.
Digital health governance	
Alignment with health system context	15. Invest first the resources and energy to build and articulate a common vision appropriated by all actors of the value chain and validated at political level. 16. Identify mechanisms to institutionalise the strategic areas that include “governance, policies and standards”, “HIS and data management”, “Health Enterprise Architecture”, “eHealth financing and sustainability” and “Capacity building and human resources for health”. 17. Separate the governance of the Digital Health Enterprise (DHE) from the different specific digital health services to be developed, lightening governance mechanisms. 18. Increase participatory governance by incorporating a stakeholder working group, including representatives of health professions and the voice of the patients, as an advisory board. 19. Nominate a “programme manager” with the responsibility of ensuring that cross-cutting governance principles are respected by all projects and prepare the decisions to be taken by the National Digital Health Governance Committee. 20. Improve data governance by creating independent bodies responsible for semantic interoperability, data security and data reuse.

6.3 Next steps

After the peer-review of the National eHealth Strategic Plan and to strengthening the implementation of the digital health strategy, EHTEL proposes to further support the Rwanda Ministry of Health and the World Health Organization by providing technical assistance in the following areas:

- **Analysis and definition of the Digital Health Governance framework**, informed by international good practices and following international standards – Control Objectives for Information and Related Technologies (COBIT), Data Management Body of Knowledge (DMBOK), Health Information Governance Architecture Framework (HIGAF) and WHO eHealth Strategic Toolkit – to reinforce the Ministry of Health model adopted by the Republic of Rwanda.
- **Technical support for the transformation of the High-Level Action Plan into an implementation plan** based on SMART objectives and KPIs to equip the governance and management bodies with a solid monitoring and evaluation system.
- **Follow-up of the implementation process** in each of the three strategic pillars – services, infrastructure and data – as mid-term review external analysis.