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For Universal Health Coverage



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Addressing Public Governance Challenges in Digital Health: Insights from Country Experiences

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Digital Health Companion: The Digital Health Companion (DHC) is an AI-enabled chatbot designed to make accessing digital health resources more intuitive, personalized, and conversational. The DHC uses a Retrieval-Augmented Generation (RAG) approach that responds to a user's questions by retrieving and generating relevant text content, based on the knowledge base added by the product's developers. The topics selected for inclusion in the knowledge base include Interoperability, Digital Health Governance, Data Science/Health Informatics, Cybersecurity, Digital Health Financing and Procurement, Health and AI/Machine Learning, Maturity Toolkits, Electronic Medical Records, Digital Health Policy & Strategy, Data Standards, and Software as a Medical Device (SaMD). These topics were selected by members of the digital health collaborative.

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Executive Summary

The increasing use of digital technology in the health sector has the potential to improve health outcomes by enabling greater access to quality health care. Use of digital technologies for collecting, recording, and reporting patient-level data in real time creates opportunities for more accurate and faster analysis of health sector performance and provides better grounds for interventions that stimulate quality and performance of health systems.

Nonetheless, governance should be seen as a critical enabler to realize the benefits of digital health, as it helps ensure that digital health is developed and used appropriately and effectively. The governance of digital health describes the combination of structures, groups, processes, standards, mechanisms, policies, and legislations that enable political, administrative, and technical authority over the management, coordination, regulation, control, and support of digital health technologies, systems, investments, activities, and health data.

Understanding the core values and enablers of sound digital health governance provides an important grounding for governance-strengthening activities. Five foundational values that guide digital health governance include stakeholder participation, integrity and accountability, openness and transparency, equity and inclusiveness, and respect for the rule of law. Though not specific to digital health, the Organisation for Economic Co-operation and Development (OECD) outlines a common set of four baseline enablers of good governance: commitment, vision, and leadership; equitable and evidence-informed policy making; whole-of-government coordination; and innovation and change management. These enablers, as well as a fifth on human capital and civil/citizen education should guide planning and decision-making for good digital health governance.

The dimensions of governance most relevant to digital health include regulatory instruments, institutional leadership, governance of human and financial resources, and coordination. Regulatory instruments are discussed with a focus on laws, regulation, and policy, emphasizing the importance of an agile regulatory framework. Institutional leadership is presented based on the Broadband Commission's institutional models for governing digital health, and guidance is provided on key considerations as countries select an institutional model most suitable for their context when considering a Ministry of Health model, a government-wide digital agency model, or a digital health model. Governance of human and financial resources is discussed from the perspective of governance to advance health care workers' skills and competencies, recruit and retain information communication technology (ICT) professionals, and undertake good financial management of digital health, including working toward efficiency gains through appropriate deployment of technology. Each of these dimensions is relevant and must be considered simultaneously as they all feed into and strengthen one another. Activities to develop each dimension evolve through various stages influenced by digital health strategy or goals and country aspirations.

The approach to implementing digital health activities can be stylized as a cycle, though real-world complexities often result in delays, diversions, and stops at different stages of the cycle. The cycle begins with an initiation phase as an entry point for countries starting out in developing digital health governance activities and countries beginning a new phase of implementation. The planning phase

is next and would be the focus point for countries with existing high-level plans for digital health governance activities that are developed both strategically and operationally. The implementation phase is defined by implementation activities and would be the focus point for countries with detailed plans and initial financing and human resources in place to undertake the activities. The evaluation phase leverages measurement mechanisms to collect evidence for continuous improvement once implementation is underway, with findings used, alongside updated information on costing and human resource needs, for the next stage of implementation, bringing countries back to the initiation phase of the cycle. The on-ground reality of implementation will result in simultaneous activities being undertaken at different stages of planning, as well as potential delays, diversions, and stops.

The focus on certain dimensions of digital health governance is likely to change over time. As digital transformation in the health sector progresses, the initial focus may be legal and policy barriers due to outdated or nonexistent regulations that must be modified or put in place to enable the development of digital health but will likely face challenges related to human and financial resource limitations and stakeholder engagement and buy-in. As progress is made and institutional models are developed, coordination of stakeholders may begin to prove challenging, particularly in decentralized systems. Some challenges may linger and require continuous attention, for example, securing funding and resources to support digital health initiatives beyond initial grants and investments.

Governance practices deployed as part of digital transformation across countries and sectors provide useful learnings to be considered in the context of digital health governance. The report provides detailed learnings from Bosnia and Herzegovina's Republika Srpska, Ghana, India, Kenya, Nigeria, the Philippines, and Ukraine, as well as high-level insights from Brazil, Cambodia, and Indonesia. In doing so, the report enables readers to comprehend a range of approaches to developing digital health governance—from rapid reforms driven by political support for digital innovation or health financing reforms, to slower approaches required due to a paucity of resources and human capacity.

Led by experiences of Joint Learning Network (JLN) Digital Health Collaborative member countries, other countries, and formative literature, the objective of the report is to provide guidance to countries to inform the design and implementation of digital health governance—through country examples and analysis. The report provides specific guidance on the key dimensions of governance most relevant to digital health and specific areas of consideration within each dimension. For example, the Institutional Leadership section provides guidance on how countries can select the most suitable institutional model for digital health based on their context. The report also provides information on initiatives that can be undertaken within each dimension of digital health governance, with guidance on how to plan specific activities. This sets the scene for a discussion of specific challenges faced by JLN countries and how they were overcome. The intended audience for this guide includes mid-career and senior government staff from Ministries of Health, National Health Insurance Agencies, National Informatics Agencies, and any other government entities who are decision-makers and implementers of large-scale government digital health initiatives at the national or subnational level including Ministries of Information Technology, Planning, Finance, Cooperation, Communication, and Digital Development.

Navigating the Report

The report describes what is meant by governance for digital health and describes how governments can develop different dimensions of digital health governance to strengthen digital transformation in the health sector. It provides an overview of what public governance means in the context of digital health and important enablers and values associated with good governance. It further lays out how different governance dimensions can be developed across phases, with examples from JLN countries. Boxes are used throughout the report to present these country examples.

The report structure is as follows:

- ▶ Section 1 focuses on explaining digital health governance by looking at definitions of governance, public governance, and what good governance looks like. This section goes on to explain key concepts in digital health and why digital health governance is important. It also summarizes the values and enablers of digital health governance.
- ▶ Section 2 unpacks several key dimensions of digital health governance, including regulatory instruments, institutional leadership, governance of human and financial resources, and coordination. Based on JLN country case studies, several examples of good practice in developing these governance dimensions are presented to enable readers to contextualize what these mean in practice.
- ▶ To provide practical guidance, Section 3 describes how dimensions of digital health governance can be implemented across a three-phase cycle: strategic and operational planning, implementation, and evaluation. It further outlines specific activities under each phase and describes the complexities that can arise across the cycle.
- ▶ Based on experiences shared by JLN countries, Section 4 describes in detail how the key dimensions of digital health governance can change over time. This section goes on to outline implementation challenges over time as shared by JLN countries and lessons from governance practices in other sectors.
- ▶ The report closes with a high-level conclusion summarizing the key takeaways.
- ▶ Separate country examples provide detailed information on digital health governance over time in various JLN member countries.

Glossary of Country Cases

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UNDERSTANDING DIGITAL HEALTH GOVERNANCE

What is Governance?

At its most basic, governance refers to the processes of decision-making and the processes by which decisions are implemented (or not implemented). It is the system of roles, practices, and processes by which an entity is directed and controlled. The World Bank defines governance as “the set of traditions and institutions by which authority is exercised in a country.” This definition encompasses three key dimensions: (1) the process of selecting, monitoring, and replacing governments; (2) the government’s capacity to effectively formulate and implement sound policies; and (3) the respect of citizens and the state for institutions that govern economic and social interactions among them (World Bank 2025b).

The World Bank’s *World Development Report 2017* (WDR 2017) expands this definition by describing “the process through which state and nonstate actors interact to design and implement policies within a given set of formal and informal rules that shape and are shaped by power” (World Bank Group, ed. 2017).¹ Governance takes place at multiple levels, ranging from international bodies to national state institutions, local government agencies, and community or business associations. These dimensions frequently intersect, resulting in a complex network of actors and interests.

While governance refers to a broader spectrum of actors and processes, public governance focuses specifically on the state sphere. The Organisation for Economic Co-operation and Development (OECD) defines public governance as “the formal and informal rules, procedures, practices and interactions within the State, and between the State, non-state institutions and citizens, that frame the exercise of public authority and decision-making in the public interest” (OECD 2020).

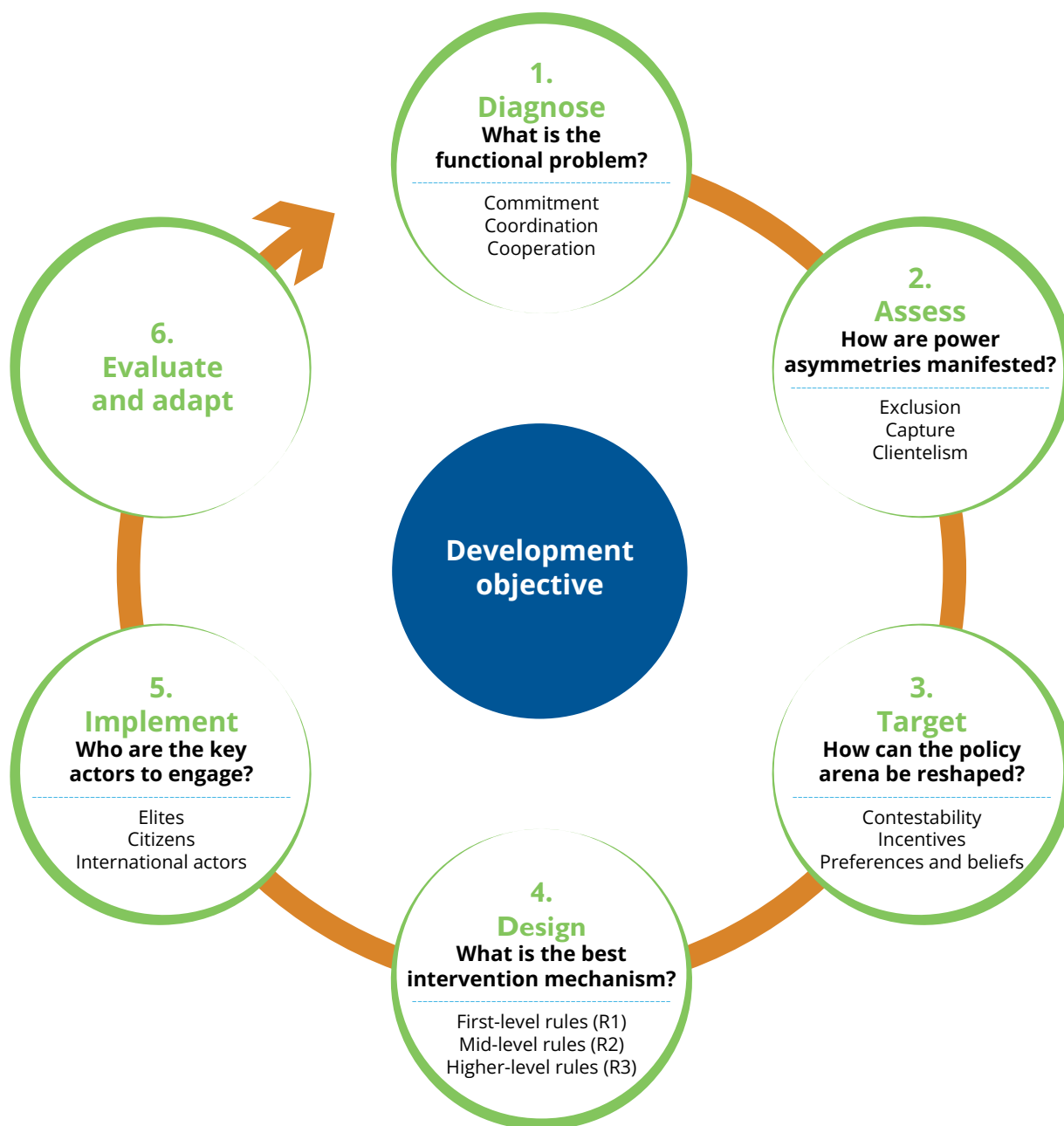
Principles and Importance of Good Governance

If governance is the process of governing, then good governance refers to the quality of the process. It is governance that is effective, equitable, and promotes the public good. Sound public governance enables governments to design and implement successful reforms that foster inclusive growth and build public trust. Governance principles are required to enable governments to respond effectively to the multidimensional challenges facing society (OECD 2020). Governance failures may lead to widespread informality in the labor market, limited access to education, and a lack of formal safety nets (OECD 2016b). Failure often involves substantial financial costs to fix problems with subsequent reforms that can perpetuate an inefficient cycle of haphazard policy trial and error undermining citizens’ trust in government’s abilities and effectiveness.

Good governance is a prerequisite for effective policy making and implementation. The *World Development Report 2017* emphasizes that policies often fail not because they are poorly designed, but because of a “governance gap,” and suggests three straightforward principles for effective governance reforms. First, it is crucial to consider not only the structure of institutions but also the functions they need to perform. Second, while capacity building is important, the effectiveness of capacity and the areas to invest in depend on the relative bargaining powers of different actors, highlighting the need to consider power asymmetries. Third, to achieve the rule of law, countries must first enhance the various roles of law to improve contestability, alter incentives, and reshape preferences, emphasizing the importance of the role of law in addition to the rule of law. Ultimately, good governance is the bedrock of sustainable development.

The *World Development Report 2017* contends that policy effectiveness cannot be understood solely from a technical standpoint but that it is also essential to consider the process through which actors negotiate the design and implementation of policies within a specific institutional context. Key institutional functions that influence policy effectiveness include the consistency and continuity of policies over time (commitment), the alignment of beliefs and preferences (coordination), and voluntary compliance without free riding (cooperation). The report offers a framework for considering specific policies by incorporating elements that can enhance the likelihood of effectiveness. This framework is embedded in a “policy effectiveness cycle,” which starts with clearly defining the objective to be achieved and then follows a series of well-defined steps: diagnosis, assessment, targeting, design, implementation, and, finally, evaluation and adaptation (see figure 1 below).

Figure 1: The WDR 2017 Policy Effectiveness Cycle



Source: World Bank Group, ed. 2017.
Note: WDR = World Development Report.

According to the United Nations (UN), good governance is made up of eight elements (Amitav Banerji 2016): participation, consensus orientation, accountability, transparency, responsiveness, effectiveness and efficiency, equity and inclusiveness, and following the rule of law. Good governance assures that corruption is minimized, the views of minorities and the most vulnerable in society are heard in decision-making, and that decision-making is responsive to the present and future needs of society. The OECD Policy Framework on Sound Public Governance, which is intended to guide and benchmark sound public governance, highlights the following (OECD 2020):

- ▶ *Public sector integrity* as an element to prevent corruption, safeguard democratic institutions, and guarantee the rule of law
- ▶ *Openness and transparency policies*, as elements to build accountability and trust, including access to public information, proactive disclosure of information and data, and strategic public communications
- ▶ *Inclusiveness, participation, gender equality and diversity*, which strengthen democracy and empower marginalized, disadvantaged, and/or vulnerable groups
- ▶ *Accountability and the respect for the rule of law*, as elements to ensure the efficiency and effectiveness of governments and public institutions, which in turn strengthen public trust

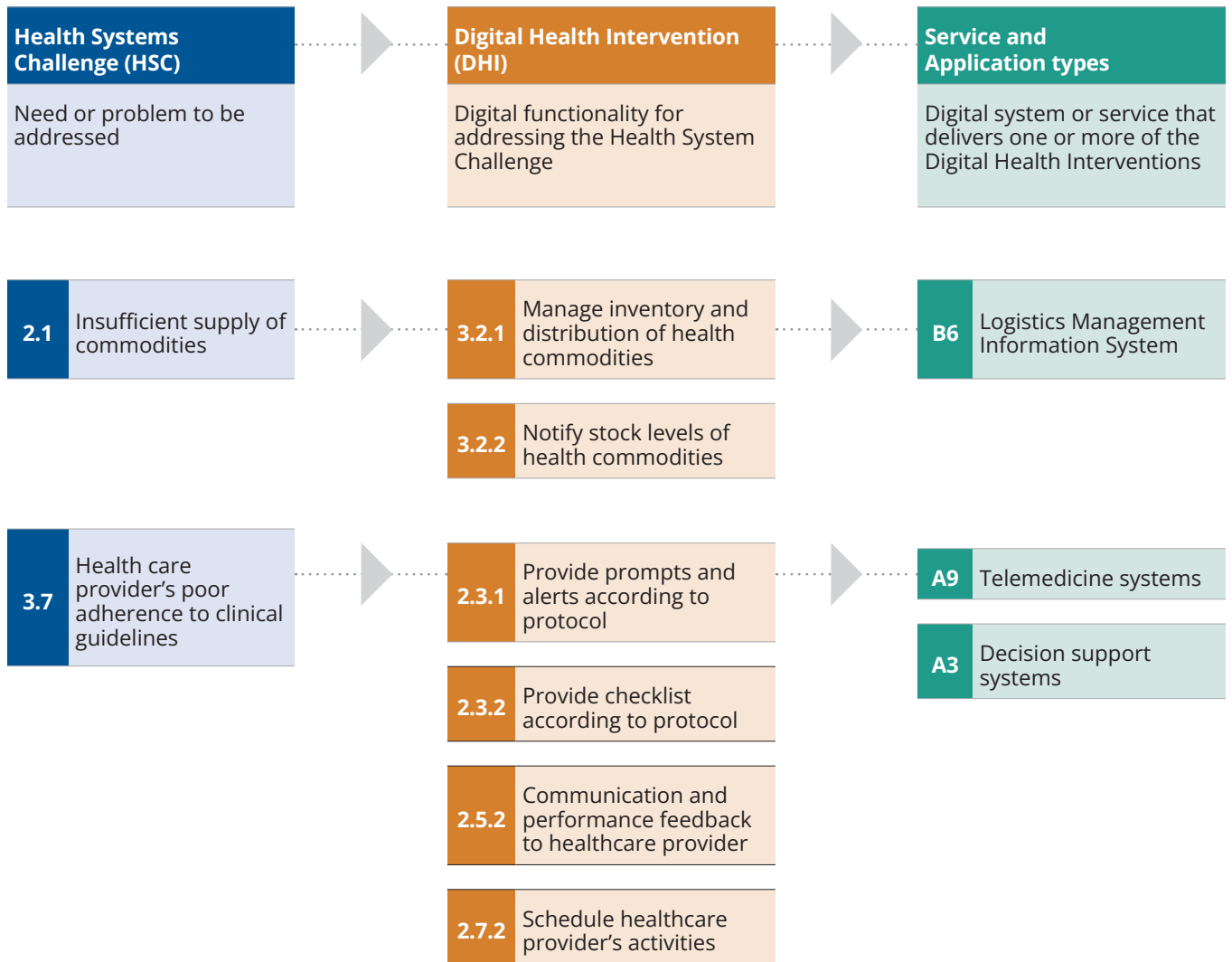
The Good Governance Institute's *Good Governance Handbook* focuses specifically on governance for the health sector (Corbett-Nolan et al. 2015). The document sets out 10 governance themes that are considered indicative of good governance. Several themes within the "application of principles" theme are also found in the UN elements of good governance and the OECD Policy Framework on Sound Governance, specifically: accountability, inclusiveness and participation, and openness and transparency.

What is Digital Health?

Digital health describes the knowledge and practices associated with the development and use of digital technologies to improve health, including the systematic application of information communication technology (ICT), computer science, and data to support informed decision-making by individuals, the health workforce, policy makers, and health institutions (WHO 2023; 2025a). The concept of digital health has developed over time as technologies and their use in the health sector have expanded. The World Bank notes that "digital health expands the concept of eHealth to include digital consumers and a wider range of smart devices and connected equipment. It also encompasses other uses of digital technologies in health care, such as the internet of things, artificial intelligence (AI), big data, and robotics" (World Bank 2023b). Importantly, the term "digital health" should not be interpreted as merely focusing on technologies to deliver health, but, rather, it describes the use of digital technology to "increase the value of health care for everyone" (World Bank 2023b), and as such, requires a range of nontechnological actors and functions, including governance.

The WHO Digital Health Classification V2.0 outlines an extensive list of digital health interventions, which include interventions for persons, health care providers, and health systems (WHO 2023). The digital services and application types described in the classification document represent the types of software, ICT systems and services, or communication channels that deliver or execute digital health interventions, as illustrated in figure 2.

Figure 2 : Examples of Linkages Between Health System Challenges, Digital Health Interventions, and Service and Application Types from the WHO Digital Health Classification V2.0



Source: WHO 2023.

What is Digital Health Governance?

Technology is increasingly being used to improve access to health for underserved and hard-to-reach populations, relieving pressure on health care systems that are often overburdened and understaffed. Nonetheless, the unique set of risks related to use of digital technology in the health sector are an important consideration for governments and the public. For example, the implementation of piecemeal or duplicate digital health interventions in the absence of national strategies can increase inefficiencies and waste resources. Clinical incidents involving digital health also emphasize the importance of having appropriate safeguards in place. For example, in the United Kingdom, the identification of patient safety concerns involving electronic medical records (EMRs) has driven calls for implementation programs to have clear structures and governance arrangements (Patient Safety Learning 2024).

A definition for *digital health governance* is the combination of structures, groups, processes, standards, mechanisms, policies, and legislations that enable political, administrative, and technical authority over the management, coordination, regulation, control, and support of digital health technologies, systems, investments, activities, and health data (Carnicero and Serra 2020; Broadband Commission 2017).² This definition was developed based on existing definitions from the Inter-American Development Bank (IDB), Broadband Commission, United States Agency for International Development (USAID), World Health Organization (WHO), International Telecommunication Union (WHO-ITU), and the Asian Development Bank (ADB). A governance *framework* is a tangible expression of governance, and in the context of digital health, a well-functioning digital health governance framework will bring together infrastructure, laws, economic policies, and institutions relevant to digital health, and align with a given society's values (World Bank 2021). While the concept of digital health governance does not change much from context to context, the governance frameworks used in countries can and should. A digital health governance framework must be able to respond to changing needs and objectives as digital health evolves (Marcelo et al. 2018). According to the ADB, the following actions, including the adoption of an operational digital health governance framework, are essential in developing strong governance for digital health (Marcelo et al. 2018):

- ▶ Mapping and identifying stakeholders across agencies.
- ▶ Defining dimensions of digital health that need governance such as architecture, assets, standards, and applications.
- ▶ Agreeing on instruments to be used for governance, such as digital health strategies or road maps, updates to the legal framework, among others.
- ▶ Defining roles and responsibilities, including leadership accountabilities, and convening all agencies and entities holding key resources into a national digital steering committee or similar body.
- ▶ Adopting an operational digital health governance framework, defining levels of governance needed to be executed at central and subnational levels, depending on the decentralization and public-private health care provider mix of the country.
- ▶ Identifying performance measures and monitoring processes for the adopted framework.
- ▶ Revisiting, updating, and keeping the governance framework active according to changing digital health requirements as technology becomes more advanced.

The governance of digital health is an evolving space and highly context specific, with a scope that is piecemeal and not well-defined. Digital health governance ties to other existing types of governance, including but not limited to, public sector governance (previously discussed), corporate governance, procurement governance, and data governance. The World Bank's *World Development Report 2021* defines data governance as creating an environment of implementing norms, infrastructure policies and technical mechanisms, laws, and regulations for data, related economic policies, and institutions that can effectively enable the safe, trustworthy use of public intent and private intent data to achieve development outcomes (World Bank 2021).³ To guide health data governance implementation, the Health Data Governance Principles bring a human rights and equity lens to the use of data within and across health systems, focusing on protecting people, prioritizing equity, and promoting health value.⁴ While no one-size-fits-all approach exists, countries can tailor their approach to developing a health data governance road map with these values.

Why Is Digital Health Governance Important?

Digital health governance is essential to realize the transition from digitalization of the health sector, where technologies are deployed largely for administrative purposes rather than improving system performance and health outcomes, to “digital-in-health,” where digital technologies are embedded across entire health systems for mission-driven and person-centered health service delivery and management (World Bank 2023b). The implications of governance failures for the digital health ecosystem are noteworthy. A lack of safety nets may pose a risk to patient safety and trust in the health system where digital health systems are not adequately developed, implemented, managed, or communicated to the public. A lack of education may limit the development of innovative digital health solutions as there are not adequate skills or numbers within the workforce. Low trust may also have health impacts if people do not trust public health care providers. In contrast, good governance of digital health can improve the functioning of health information systems to support broader health goals (Marcelo et al. 2018). This involves the development of policy infrastructure and organizational capacity across all levels of the health system to address topics such as accountability and oversight, ICT standards, security, data management and interoperability, and training strategies for skills development of those using various digital health applications (Storey and Soshnikov 2023).

Governance that addresses rights, regulations, responsibilities, and relevant risk areas has an important enabling role in realizing the benefits of digital technology to improve health (Carnicero and Serra 2020). The governance of digital health is crucial for several reasons, including the following:

- ▶ **Equity.** Governance can play a role in ensuring health equity by setting rules and guidelines that ensure digital health is developed, implemented, and used in ways that not only do not discriminate against or disadvantage certain groups, but empower them to improve their health outcomes, thus reducing health inequities.
- ▶ **Efficiency and effectiveness.** Governance can lead to greater efficiency and effectiveness by creating a framework that provides the public and providers confidence that digital health tools meet predefined standards and are implemented consistently based on specific criteria, which in turn improve health care services. Developing a knowledge base on the effectiveness of digital health is a valuable resource for scientific research and innovation, leading to new insights and interventions in health care.
- ▶ **Quality and safety.** Governance of digital health also enables quality and clinical safety, which encompasses timeliness, efficiency, effectiveness, equity, and patient-centeredness, by implementing standards, policies, and procedures relevant to the digital health ecosystem.

- ▶ **Trust.** Patients and the public need to trust that digital health is effective, accurate, safe, used appropriately, and protected adequately. Effective governance can help build this trust by promoting transparency and accountability, as well as enable the development of trust-enhancing regulatory instruments, such as those focused on data privacy and security.
- ▶ **Interoperability.** Digital health systems and platforms are most useful when the data they generate can be shared across health care systems and providers. Effective governance can help promote interoperability or the ability of various information systems, devices, and applications to access, exchange, interpret, and use data in a coordinated manner.

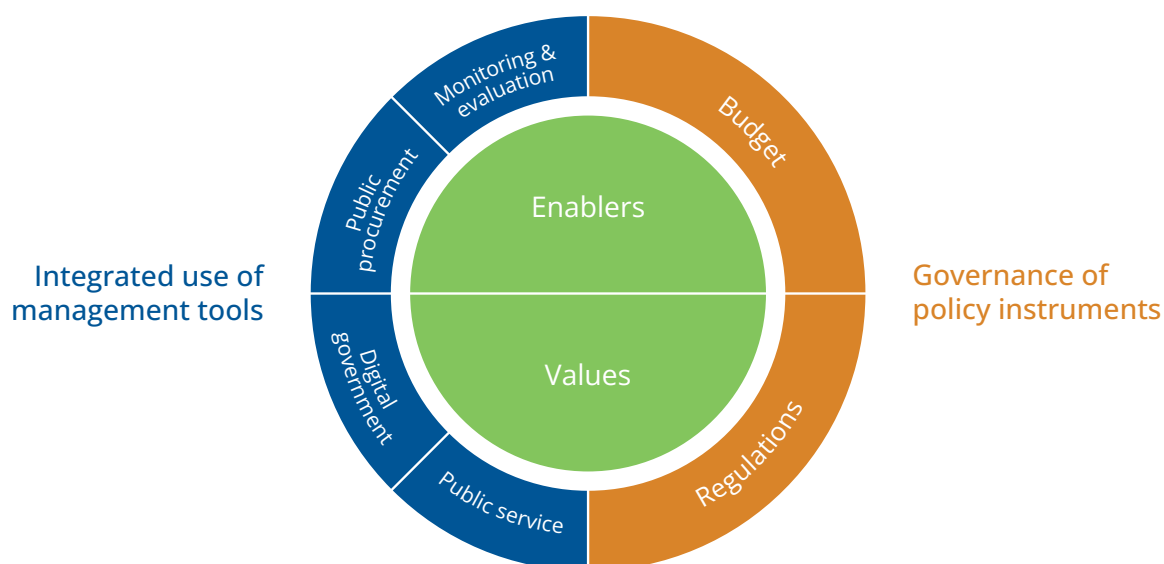
Values and Enablers of Digital Health Governance

According to the OECD, the elements of sound public governance are a combination of three interconnected and mutually dependent elements (OECD 2020): values, enablers, and instruments and tools (as shown in figure 3 below).

Values underpin how governments select and prioritize policy problems, take policy decisions, and structure their relations with stakeholders. The OECD defines a set of *enablers* that support governments pursuing effective and equitable decision-making and reform, noting that sound public governance directly relates to how governments formulate, implement, communicate, and evaluate reforms and policies. To this end, *policy instruments* and *management tools* are used by governments at different stages of the policy cycle for efficient governance and policy implementation.

Based on the OECD Policy Framework on Sound Public Governance (illustrated below), and the UN good governance themes (discussed previously), a set of values, enablers, and instruments and tools can be proposed for sound digital health governance, adapted to reflect the values and enablers considered most relevant to digital health.

Figure 3: Elements of Sound Public Governance



Values to Ground Digital Health Governance

Work toward developing robust, fully integrated, and effective digital health ecosystems should be grounded in governance guided by five foundational values. These values include stakeholder participation, integrity and accountability, openness and transparency, equity and inclusiveness, and respect for the rule of law. As a starting point, developing laws and regulations according to good regulatory practices can reinforce the foundational values for digital health governance. Such practices include consultative rulemaking and evidence-based regulatory development, with stakeholder impacts and spillover effects fully considered through regulatory impact analysis (World Bank 2021).

Stakeholder Participation

Governance needs to consider all relevant stakeholders, even those who may not be immediately apparent. Participation by diverse population groups, including those most vulnerable in society, is a cornerstone of good governance and can be either direct or through legitimate intermediate institutions or representatives. Platforms for effective participation are context specific and may include technical working groups, advisory committees, key stakeholder meetings, and public consultations, with specific examples of these discussed in country examples presented throughout the report. Participation needs to be informed and organized, with the right of freedom of association and expression on the one hand and an organized civil society on the other hand. In the context of digital health, considering how to enable meaningful participation from members of society struggling with digital literacy is an important dimension of stakeholder participation.

Stakeholder Participation in Policy Development in Ghana

Stakeholder participation was central in the development and implementation of recent policy documents in Ghana. The Health Information System Strategic Plan (HISSP) 2022–2025 and the Ghana Health Service (GHS) Policy and Strategy on Digital Health 2023–2027 were both developed through multistakeholder consultation.

The HISSP outlines how data will be collected, analyzed, disseminated, and what data are collected and why. To develop the HISSP 2022–2025, all the agencies under the Ministry of Health (MoH) were brought together to develop an outline. A scoping review of relevant documentation, key informant interviews to capture institutional knowledge, and a strengths, weaknesses, opportunities, threats (SWOT) assessment was undertaken to develop the content of the document. Once a draft was ready, it was shared at agency meetings and at the health summit of the MoH in 2022 to get the views of a range of relevant stakeholders and build their buy-in.

Similarly, the GHS Strategy on Digital Health was developed based on situational analysis findings from interviews with relevant stakeholders from across the country, including individuals at the national, regional, and community levels. The strategy was validated at two stakeholder meetings, including at a senior managers' meeting where all senior directors were in attendance. The development team worked closely with academia, including Kwame Nkrumah University for Science and Technology (KNUST) and other universities. To encourage regional buy-in, the document was launched in 16 regions to ensure local stakeholders were aware of the strategy and how to implement it.



Integrity and Accountability

Integrity refers to the consistent alignment of, and adherence to, shared ethical values, principles, and norms for upholding and prioritizing the public interest over private interests in decision-making. To do so, governmental institutions, as well as the private sector and civil society organizations, must be accountable to the public and to their institutional stakeholders. Who is accountable to whom varies, but generally an institution is accountable to those who will be affected by its decisions or actions. While accountability is vital at the national level, it is also of particular importance at the subnational level, as local governments are responsible for the most visible and concrete public services.

Openness and Transparency

Transparency in governance is critical in building trust in public institutions. Openness and transparency policies include accessibility of information and other public resources and proactive disclosure of information and data. Given the importance of openness and transparency in governance and policy making, open government strategies and initiatives have become a key pillar of public governance reforms. The OECD defines open government as “a culture of public governance that promotes the principles of transparency, integrity, accountability and stakeholder participation in support of democracy and inclusive growth” (OECD 2020). In the context of digital health, openness and transparency measures that enable access to health data in an open format must balance these principles with regulatory requirements regarding data protection and public opinion on health data sharing.

The Development of Health Dashboards in Ukraine



Openness and transparency are central to government eHealth development plans. Developed electronic health system (EHS) architecture will enable the public to access aggregated data via the national open data portal (Ukraine Government 2025) and view summarized and visualized analytical reports (dashboards), which are based on data entered by all providers on the National Health Service of Ukraine (NHSU) website (NHSU 2025). Combined with monthly reports on the implementation of the state Medical Guarantee Program, these resources allow for transparency and public accountability.

According to the Transparency and Accountability in Public Administration and Services (TAPAS) project (TAPAS 2024), the NHSU is one of the first state institutions in Ukraine to begin visualizing data in a user-friendly format. The use of dashboards on the NHSU website accounts for 20 percent of all website traffic, the report says. In January 2020, the number of views was over 176,000, and in March 2020, before the start of the second stage of the health care reform, there were almost 510,000 views. The effectiveness of this approach is confirmed by the overall indicator of data openness in the European region (European Union 2023). As of June 2025, 34 publicly available analytical dashboards received over 1.6 million views annually and 12 datasets were published on the Unified State Open Data Portal, which are used by policy makers, journalists, and civil society or the public.

Ukraine is also working toward improving digital literacy, with implications for improving transparency and accountability if more of the population is empowered to engage with patient portals and health data. Digital literacy initiatives are led by the Ministry of Digital Transformation and the Ministry of Education and Science. Diia. Digital Education, a national web-based platform for building digital literacy and digital skills launched in 2020 (Digital State UA 2025), and the Digital Competence Framework for Citizens of Ukraine published in 2021, were important starting points for further initiatives to be developed. In the three years following the launch of the Diia. Digital platform, 6 million citizens participated in digital literacy programs. In 2023, the next phase of the Diia. Digital project saw the updating and renaming of the platform, Diia.Education, a no-cost, accessible platform for citizens to use to gain up-to-date knowledge and practical skills in technology. The format of the learning includes educational series, simulations, and tests on digital skills.

Equity and Inclusiveness

An equitable, nondiscriminatory approach to governance based on the needs of all societal groups, including the most vulnerable, is a vital element to guarantee human rights and fundamental freedoms for the whole of society. Applying equality and inclusiveness principles to decision-making processes and ensuring the targeted participation of all societal groups can help governments better understand the needs of people and how to respond to them more effectively. Such a lens also helps decision-makers assess the differentiated impacts of their decisions to evaluate whether any given policy mitigates or reinforces existing inequalities. Robust mechanisms for public and patient inclusion and engagement will help governments better understand needs in the digital health context, as well as the real-world impacts policies on digital health have had.

Respect for the Rule of law

Fair legal frameworks are enforced impartially with full protection of human rights, particularly those of minorities. The legal framework must guarantee that every individual in society is equal under the law and no individual or group obtains special treatment by virtue of origin or background, socioeconomic circumstances, or links to society's power structures. Effective and efficient justice systems at all levels of government are crucial to sustaining the rule of law and sound public governance. Respect for the rule of law is closely connected with other governance dimensions.

Enablers of Sound Digital Health Governance

Though not specific to digital health, the OECD outlines a common set of four baseline enablers that can contribute to a better definition and implementation of good governance (OECD 2020). These enablers, as well as a fifth on human capital and civil/citizen education, are all relevant to the governance of digital health in the following ways:

- ▶ **Commitment, vision, and leadership, both politically and operationally, to ensure sustainability.** In the context of digital health, where development and implementation of technologies and systems can take time—often spanning multiple political and financing cycles—plans, commitment, vision, and leadership for sustainability become critically important.
- ▶ **Equitable and evidence-informed policy making, to strengthen good governance in using evidence in decision-making and prevent unbalanced interest-based influence.** In the context of digital health, where challenges to inequity based on internet access and digital literacy, among other factors are typical, the importance of equitable and evidence-informed policy making is critical.
- ▶ **Whole-of-government coordination, to ensure a coherent, integrated approach to multidimensional challenges, where coordination is notably but not exclusively led by the center of government.** In the context of digital health, the end user is much closer to local and regional government, and given the nature of health and care seeking, must be more involved in dimensions of digital health governance (e.g., through patient and public involvement and engagement). Accordingly, whole-of-government coordination is a critical enabler of sound digital health governance.

- ▶ **Innovation and change management, to introduce and implement new ideas that in turn support society to transition to the future.** In the context of digital health, where horizon scanning is essential to managing the fast-paced nature of innovation and emerging technology (e.g., artificial intelligence and machine learning), the “future proofing” of governance activities ensures they are more likely to stay relevant in this environment.
- ▶ **Human capital and civic/citizen education, to ensure meaningful and inclusive participation of a knowledgeable public.** Human capital consists of the knowledge, skills, and health that people invest in and accumulate throughout their lives, enabling them to realize their potential as productive members of society (World Bank Group 2019). Civic and citizen education focuses on people’s knowledge and understanding of formal institutions and the processes of civic life (Khadka and Bhattarai 2012). It involves learning about the governance system, laws, and public interest matters. Civic education also emphasizes the importance of citizens working together, understanding democratic norms and values, and adopting peaceful ways to achieve objectives. In the context of digital health, contributing to civic/citizen education and participation, as well as ensuring people can make the most of digital health are important ways to develop meaningful public participation as a core value of good governance.



**UNPACKING
DIGITAL HEALTH
GOVERNANCE**

This section presents a nonexhaustive selection of governance dimensions most relevant to governing digital health (see figure 4 below). While there are countless dimensions that can be related to digital health governance, the following four are foundational across national contexts.

Figure 4: Relevant Dimensions of Digital Health Governance



Source: Authors.

Regulatory Instruments

The introduction of regulation for health, digital transformation, and facilitating the development of digital public infrastructure provides a legal basis that enables a digital health ecosystem to flourish, and supports innovation. In the context of digital health, regulatory instruments are employed to facilitate the implementation of digital health strategies and policy plans. *Regulatory instruments* include laws, regulations, guidelines, standards, codes of conduct, certification schemes, and rules and procedures that, together, make up a regulatory foundation enabling sound advancement of digital health initiatives (World Bank, Forthcoming). Table 1 provides an overview of regulatory instruments, their features, and examples.

Table 1: Types of Regulatory Instruments

	Law	Regulation	Guideline	Code of conduct	Policy	Standard	Certification / Accreditation	Rules and procedures
Issuing body	Legislator, often Parliament	Minister / regulatory agency	Regulatory agencies, ministries, expert committees	Industry bodies and associations, regulator	Any given organization	Standard-setting organization, government body	Regulatory agencies, associations	Ministries and regulatory agencies, industry bodies
Top-down/ bottom-up	↓	↓	↓	↓↑	↓	↑	↓↑	↓↑
Objective	Establish concepts, rights, obligations, accountability, enforcement, regulatory agency	Rules detailing implementation of the law	Principles or advice guiding decision-making and compliance	Often self-regulatory establishment of rules and enforcement mechanisms	Express aspirations, intentions, plans or principles	Technical or ethical norms on quality, safety or governing industry interactions	Mechanisms used to indicate eligibility, qualification or compliance	Instruments that specify detail of compliance and how issues are to be treated
Legally binding / Enforceable	✓	✓	~	~	✗	~	~	~
Best case development time	1-2 years	3-12 months	3-12 months	3-12 months	3-12 months	6-36 months	3-12 months	3-12 months
Example	Nigeria's Data Protection Act 2023	India's New Drugs and Clinical Trials Rules 2019	Infectious Diseases Society of America (IDSA) Guidelines	The ICN Code of Ethics for Nurses 1953 (revised in 2021)	Vaccination policies during COVID-19	ISO 15189, on requirements in medical laboratories	Security certifications issued by the German Federal Office for Information Security (BSI)	Health Information Trust Alliance (HITRUST) Common Security Framework

Source: World Bank, Forthcoming.

Note: ~ = Instruments that, although not legally binding, are considered sufficiently authoritative that not following them might be treated by courts or regulatory authorities as evidence of non-compliance, giving them legal force.

Regulatory instruments differ depending on several factors including the overall objective, the authority issuing the instrument, the directionality, and whether they are legally enforceable (World Bank, Forthcoming). Among the types of regulatory instruments, laws typically establish rights and obligations, while regulations, made under the authority of laws, provide additional details on how the established rights and obligations apply in practice. Policies, which may be developed by ministries or regulatory agencies, but can be developed by any organization, are a set of strategic directions, principles, and/or ambitions. Policies are much more flexible and adaptive than regulations, and are not typically legally binding, which enables them to be designed for set time periods, or for emergencies or temporary priorities.

Laws and Regulations for Digital Health

Laws are the foundational layer of the legal and regulatory framework, while regulations facilitate and enable the application of laws. When digital health reforms are not coded in laws, regulation, and policy, the possibility of reversals or fragmented or short-term investments become a major risk to progress. Laws and regulations also provide the foundation for upholding the values of good governance for digital health. National and international regulations related to data protection, for example, provide a privacy and protection framework for the development of national health information systems (DLA Piper Intelligence 2025). They help protect against data breaches, identity theft, and unauthorized access to sensitive and personal health information. A focus on individual rights relies on and upholds the values of openness and transparency, equity, and inclusiveness. By developing well-designed laws and regulations, governments can build trust and confidence in digital health initiatives, contributing to their acceptance and success (Bredenkamp et al. 2022; Ukraine, Verkhovna Rada 2020; ILO 2021; WHO 2024).

Since the regulation of digital health is typically managed through different legal arrangements, various regulatory and enforcement bodies will likely have jurisdiction over their enforcement (see table 2 below for examples).

Table 2: Regulatory and Enforcement Bodies Relevant to Digital Health

Digital health regulatory area	Possible regulatory and enforcement bodies
Regulations for data management (DLA Piper Intelligence 2023)	<ul style="list-style-type: none"> • Ministry of Communication or similar • Data protection authority/agency • Cybersecurity agency • Arms-length agencies under or adjacent to the Ministry of Health with some data management oversight responsibilities (e.g., pertaining to EHR)
Medical device regulations (DLA Piper Intelligence 2024)	<ul style="list-style-type: none"> • Ministry of Health • National medicines regulator • Professional bodies/Associations
Regulations governing the delivery of medical services supported by digital health solutions	<ul style="list-style-type: none"> • Ministry of Health • National- or state-level body with remit to regulate quality of care • Professional bodies/Associations

Source: Authors.

Note: EHR = Electronic health record.

It is often necessary to extend the remit of existing regulatory and enforcement bodies to support the development of regulatory instruments relevant to digital health, rather than set up new bodies. In countries that introduced legislation specific to digital health (e.g., around allowing medical acts to be performed remotely, or medical documents to be sent online without a paper version), the MoH has seen its responsibilities extended as it became responsible for regulating (through guidance, policies, rules, etc.) those new legal requirements. Determining the most appropriate coordination mechanisms between bodies responsible for developing and implementing regulatory instruments is also important and is discussed as part of the Coordination section.

Well-designed and clear regulations can be seen as a driver of growth in the use of digital health (Aditya and Indradjaja 2022), creating a level playing field for all innovators across the public and private sectors, ensuring transparency and regulatory certainty, and providing benefits to the health sector by facilitating safer and more effective use of digital solutions. Well-regulated digital health solutions used for health service delivery can provide legal certainty on issues of technology product liability and safety that encourage innovators to enter the market and service providers to adopt solutions with greater confidence. Poorly designed regulation can instead be viewed as a hinderance to growth that limits innovation. The speed of innovation can pose a challenge to the development of well-designed regulation. Regulation of digital health technologies, especially emerging technologies such as generative artificial intelligence (AI) for use in the health sector, is still a work in progress in most countries, requiring multiple adaptations based on the pace of technological innovation.

There are several types of regulations focusing on different digital health areas: regulations for data management, medical-device regulations, regulations governing the delivery of medical services supported by digital health solutions, health research regulations, and employment regulations, regulations focused on intellectual property (IP) and on AI and machine learning (ML) (see table 3) (Broadband Commission 2018).

Table 3: Regulatory Instruments for Different Digital Health Areas

Digital health regulatory area	Description of regulatory goals
Data management including data protection and quality regulations, standards, and governance mechanisms	Collectively ensure the safe and ethical use and sharing of digital health data.
Digital health infrastructure including electronic health records, interoperability, standards, among others	Collectively ensure the safe and ethical development and use of digital health solutions, including their technical design.
Medical device regulations	Facilitate the approval and use of safe, cost-effective, and high-quality digital health solutions.
Regulations governing the delivery of medical care, including telemedicine (e.g., Telehealth Act), payment, and reimbursement, among others	Enable providers to be supported and enhanced by digital health solutions and define payment and reimbursement of services delivered or supported by digital health solutions.
Health research regulations	Ensure research involving human subjects that incorporates digital health solutions, including clinical trials, is safe and ethical.
Employment regulations	Ensure the workforce has the necessary skills and competencies related to the use of digital health solutions, including through changes to scopes of practice among different cadres of health care workers, and subsequent updates to their professional education (OECD and ILO 2022; Socha-Dietrich 2021). Updates to quality standards relevant to digitally enabled health service provision and accreditation practices are additional examples.
Regulations governing IP	Collectively enable innovation by offering protections and rights including through patents, trademarks, design rights, and copyright as pertaining to digital health solutions (Legal Foundations 2024).
AI and ML regulations	Facilitate the management of AI/ML and their associated risks in the context of use in the health sector.

Source: Adapted from Broadband Commission 2018.

Notes: IP = Intellectual property; AI = Artificial intelligence; ML = Machine learning.



The Development of a Digital Health Agency in Kenya

The Digital Health Act (2023) was developed out of a need to govern the increasingly piecemeal digitalization of health programs and associated fragmentation and with the recognition that digital health could contribute to quality of care. The legislation aimed at positioning Kenya as a leader in digital health within the region by digitizing health records, establishing eHealth services, and integrating telemedicine, particularly to serve rural areas. The act represented a significant step in advancing the digital health agenda and made Kenya the first African country to mandate the regulation of digital health activities (Townsend et al. 2023). Given the flourishing digital health landscape, it was important that the Digital Health Act did not stifle innovation and ensured that point of care systems could exchange data while keeping data secure.

As part of the act, a Digital Health Agency (DHA) was established with the core mandate to develop, operationalize, and maintain a comprehensive Integrated Health Information System and Health Information Exchange (HIE) with several registers within the platform. The DHA is responsible for creating information registries, managing data exchange, ensuring health application systems and infrastructure that are fit for purpose, developing interoperability standards, certifying digital health solutions, mobilizing resources for sustainability, and providing an advisory role to the cabinet secretary for health on matters related to digital health (KELIN Kenya 2023).

The act mandates the DHA to be the custodian for all health data in Kenya, and the health data to be used for public good, whereas public good is not defined within the act. As a result of potential overlap with existing regulatory instruments, it was important to bring stakeholders together during the consultation process to help them understand why a specific Digital Health Act was necessary. Additionally, it was important to develop the act without overstepping into existing areas of regulation and without picking up functions that may not necessarily be for the Ministry of Health to govern. In November 2024 the Kenya Ministry of Health initiated a public consultation for three draft regulations under the Digital Health Act: Health Information Management, Data Exchange, and use of eHealth Applications and Technologies (DataGuidance 2024).

Setting up the Digital Health Agency

Immediately following the mandate to set up the DHA, the Board and acting CEO were put in place; however, the MoH Directorate of Digital Health, Informatics, Policy and Research (DHIPR) remained in charge of digital health. ICT officers from the Ministry of ICT were posted under MoH for a period of time to support the implementation of digital health. They work within the MoH and for the Council of Governors (CoG), who oversee county implementation and support. The DHA is governed by a Board of Directors consisting of the following:

- ▶ A nonexecutive chairperson
- ▶ Three principal secretaries responsible for health, National Treasury, and ICT
- ▶ A data commissioner
- ▶ A private sector representative
- ▶ A nominee of the Council of County Governors
- ▶ Two digital health experts (not civil servants)
- ▶ A chief executive officer, ex-officio

There have been several challenges related to the overall structure and roles and responsibilities around the DHA. Although the agency already has a body in place, it is missing the operational human resource aspect. However, once the governance framework is set up, it will be clearer which steps are required to operationalize the agency, its direction, and the human resources needed.

Additionally, the Digital Health Act has been challenged on grounds of privacy and data protection and rendered intrusive and unconstitutional by the Kenyan High Court. The plaintiff raised concerns about data security and privacy because the act required the unique identification of every Kenyan for health services, which was confirmed by the high court to not adequately safeguard privacy rights of Kenyan citizens (Muhoro and Gitonga Associates 2024). Following the court's decision, the act was suspended for 120 days. However, the decision was stayed by a court of appeal, which allowed interim implementation.



Regulatory Instruments Required to Implement the Integrated Health Information System (IHIS) in Republika Srpska of Bosnia and Herzegovina

Responsibilities for health sector governance in Bosnia and Herzegovina are decentralized to two entities, Republika Srpska and the Federation of Bosnia and Herzegovina, and a small autonomous Brcko District. Republika Srpska, with a population of one million, operates 74 public health care providers, including 55 primary health care centers, 18 general and specialized hospitals, and one clinical center.

To efficiently manage the health care system, improve service delivery and quality, and collect and process health-related data, the Republika Srpska government amended the Law on Health Care in 2015 to introduce the development of the Integrated Health Information System (IHIS). The law assigned the Health Insurance Fund (HIF) the responsibility for organizing and financing IHIS due to its sufficient human resources and financial capabilities. In 2017, the government adopted a bylaw to further regulate the organization, development, and functioning of the IHIS. IHIS aimed to provide a centralized health service infrastructure, encompassing a centralized patient medical record system and various services that leverage data exchange, including drug prescription, referrals, laboratory requests, and results. The bylaw further tasked the HIF with managing the system's implementation, development, and maintenance.

IHIS development was a significant financial undertaking, prompting HIF to secure a loan to cover the expenses for software solutions, server infrastructure, communication hardware, network lines, and 3,000 users' workstations. In 2019, HIF contracted a company to create the software, which took two years to develop. The HIS was officially completed on September 13, 2021, followed by a year of implementation. HIF created a Health Data Exchange unit to coordinate IHIS project implementation. A Project Supervisory Board, comprising representatives from ministries, agencies, and health care providers, was established to oversee the implementation. The Supervisory Board added value by effectively managing contractor exaggerations and quickly steering development to better serve end users.

Legislative changes were needed to fully implement the system and enable digitizing paper records (patients' and various medical records), referrals, prescriptions, and other documents. New laws adopted in 2022, such as the Law on Healthcare, the Law on Mandatory Health Insurance, and the Law on Healthcare Documentation and Records in the Field of Healthcare, enabled the IHIS's use. The Law on Health Care Documentation and Records also revised the way health documentation is formed, stored, and processed.

The IHIS communication infrastructure is managed by a local telecom provider, which facilitates secure communication between health care facilities and the central IHIS component, effectively isolating it from the public internet. This Multiprotocol Label Switching (MPLS) networking service ensures protected communication for private network data exchange, thereby safeguarding the system against cyberattacks, enhancing the quality of service, and prioritizing critical traffic. Rather than having each health care facility individually negotiate contracts with the telecom provider, HIF established an umbrella contract with the provider. This centralized approach led to increased efficiencies and cost savings by reducing the overall price, due to the large number of contracted services.

HIF gave each health care facility the option to either retain its existing information system or switch to the new IHIS, facilitating data migration. Facilities that chose to keep their own systems were legally required to ensure interoperability with the IHIS. Several bylaws were enacted to establish the conditions for integration and interoperability, followed by the definition of standardized technical requirements for integration. HIF covers all costs related to maintaining the system and providing technical support services, ensuring no extra expenses for public health care facilities, including those related to integration to IHIS.

While most public health care facilities opted to use the IHIS, some chose to maintain their existing systems and integrate them with IHIS. These decisions were driven by significant investments made in their current systems over the years, as well as the customization tailored to their specific organizational needs and business processes. For example, the largest teaching hospital, the University Clinical Centre of Republika Srpska, along with two general hospitals that shared the same system, preferred to continue using their established systems. Private health care providers are still reluctant to integrate their systems with IHIS, often citing concerns about doctor-patient confidentiality. Many believe that patient information should be exclusive to their doctors. This view hinders the creation of comprehensive health records needed for better patient care. The government is currently drafting regulations that are expected to facilitate data sharing with private providers.

After laying the foundation for the IHIS, HIF has now moved forward with plans for further development. The 2024–2029 Program of Work, Development and Organization of the IHIS outlines clear priorities to continue enhancing the system. The immediate priorities include (i) creating a new module for prevention services to support the implementation of a mass noncommunicable diseases prevention program; (ii) achieving complete integration of laboratory information systems across all public health care facilities; (iii) redesigning the mobile app to improve user experience and functionality; and (iv) providing integration services for external users such as the Institute for Labor Medicine and Sport, the Institute for Transfusion Medicine, and private facilities offering health services funded by the HIF. These goals reflect a forward-looking approach, recognizing past achievements while paving the way for a more efficient and digitized health care system in Republika Srpska.



Overview of the Approval Process for the Digital Health Initiative Memorandum in Nigeria

To address poor health outcomes and accelerate aspirations toward Universal Health Coverage (UHC), the government of Nigeria has articulated a health sector reform agenda that aims to save lives, and reduce physical and financial pain for all Nigerians. In December 2023, all orders of government in Nigeria and their development partners, signed a compact supported by a Sectorwide Approach (SWAp). The SWAp established the leverage to deepen federal-state dialogue in Nigeria's federal institutional arrangements, providing a platform for additional domestic resource mobilization and better accountability for results. It supported efforts for joint planning, delivery, monitoring, and accountability to drive efficiency, transparency, and accountability for health spending and key inputs and processes. Most partners have now aligned their resources and financing with the priorities outlined in the SWAp and are members of the thematic technical working groups set up to actualize the approach. One of the unique features of the ongoing reform efforts is to deploy a Nigeria Digital in Health Initiative (NDHI) across all orders of government in the federation, and collapse fragmentation in the use of digital platforms for expanding service coverage.

The National Health Act of 2014 provides the framework for the regulation, development, and management of Nigeria's health system and sets standards for rendering health services across all orders of government in Nigeria's federal arrangement including the public and private sectors. The act outlines the role of the National Council on Health (NCH), including its membership and responsibilities. The NCH is the highest policy-making body on matters relating to health, including identifying health goals and priorities for the nation as a whole, monitoring the progress of their implementation, and coordinating health services rendered by the federal ministry with services rendered by the states, local governments, wards, and private health care providers.

The NCH determines the time frames, guidelines, and format for the formulation of national and state health plans and is advised by a technical committee. Practically, states and other relevant stakeholders present memorandums that are discussed by the council in three steps (figure 5). The process culminates in a two-day meeting of the NCH where 36 state commissioners decide by voting whether the memoranda discussed will pass. Once passed there is a mandate for each memorandum to be implemented across the country; however, less than one-third of memos put to the NCH are passed. Previous NCH meetings approved key memoranda on digital health, including a resolution that the National e-Health Strategic Framework be adopted as a framework for sustained integration of ICT in health care in Nigeria at the 58th NCH (2016) and the migration of routine health information data at primary health care facilities from paper to electronic at the 63rd NCH (2022).

Figure 5: Process When a Federal-Level Memorandum is Taken to the NCH



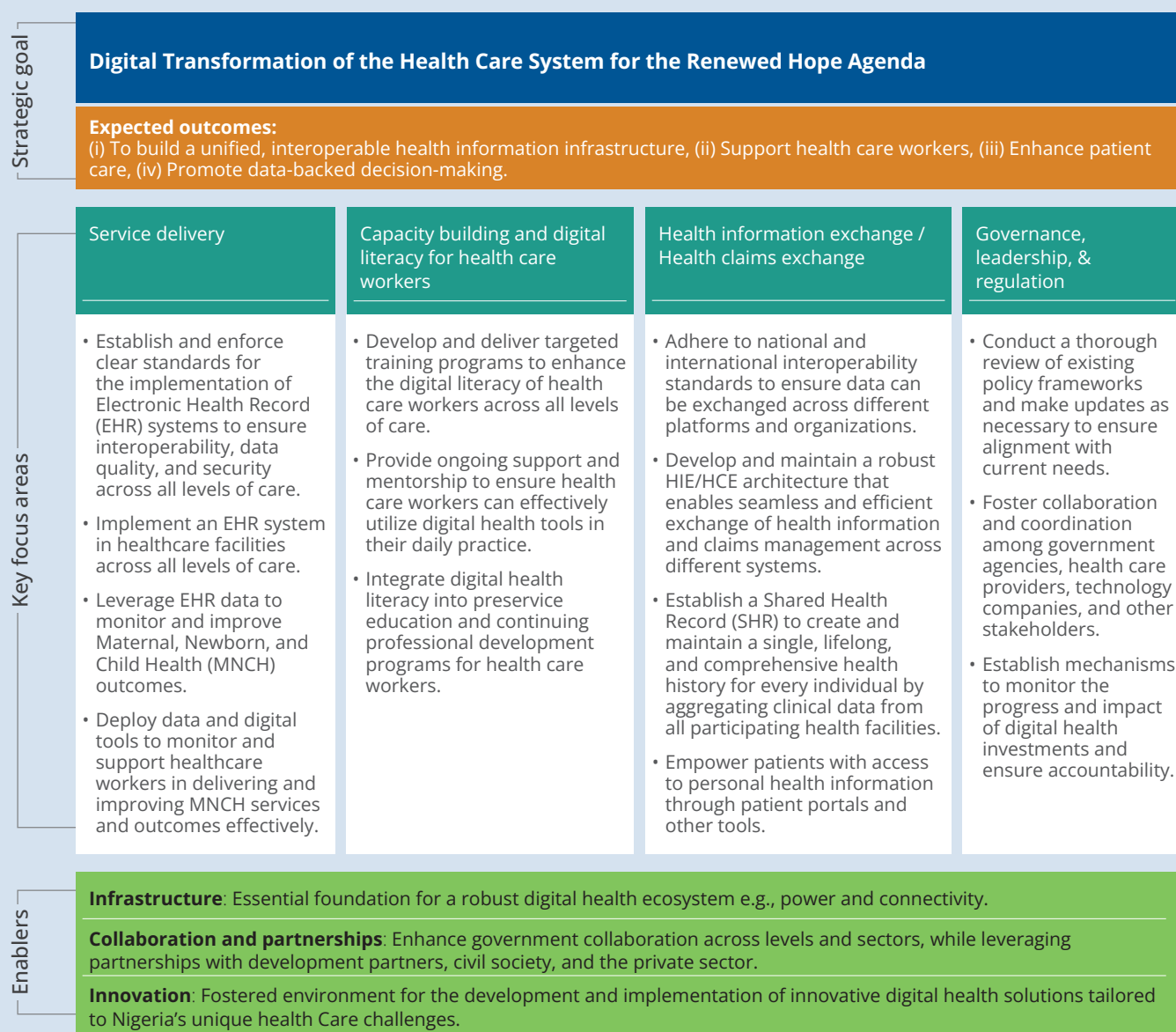
Source: Authors.

Note: NCH = National Council on Health.

At the 65th NCH meeting held on November 18–22, 2024 (with a technical session on November 18 and 19, and a council session on November 21 and 22), 81 memoranda under the theme “Accelerating Pathways to Universal Health Coverage: Strategies for 2030 Success” were discussed, including several under the subtheme “Innovations in Digital Health: Transforming Healthcare Delivery.” Following the technical session, which included technical presentations and panel discussions, only 18 of 81 memoranda were approved by the final session of the council.

The memorandum, “The Adoption and Implementation of Nigeria Digital in Health Initiative at the National and Subnational levels” was one of 18 memoranda approved. The Nigeria Digital in Health Initiative memorandum outlines the intention to establish a national digital health enterprise architecture with key components like electronic health record (EHR) systems, data repositories, integrated health information exchanges, etc. The initiative further seeks to develop a regulatory framework for homegrown innovation as well as governance frameworks linked to the national health insurance system toward the strengthening of the health care workforce and delivery of UHC (figure 6). Emphasis is placed on creating a conducive environment for private sector providers and private–public digital partnerships to leverage innovation, skills, and resources. These aims are linked to the National Digital Health Strategy (2021–2025), which details the need to have a mature digital enterprise architecture.

Figure 6: Digital Transformation Framework



Source: Nigeria Digital in Health Initiative 2024.

Notes: HIE = Health Information Exchange; HCE = Health Care Environment.

Key components of the Nigeria Digital in Health memorandum include the following:

- ▶ Leadership and governance: Restructuring the governance structure at the national level, and technical support for setting up governance structures at state level, local government areas, and health facilities.
- ▶ Strategy and investment: Set up a digital health investment drive for fund coordination mechanisms, mobilize special purpose digital health funds.
- ▶ Standards and interoperability: Develop and implement an interoperable standard and digital health platform in collaboration with other relevant stakeholders, particularly for the National Digital Health Platform (NDHP).
- ▶ Legislation policy and compliance: Commence processes of aligning national digital health strategy with existing relevant government policies and developing health sector-specific, privacy, security, and confidentiality guidelines for digital health services and applications.
- ▶ Capacity building: With activities including assessment of the digital health readiness of stakeholders, definition of professional practice standards, development and rollout incentive schemes for digital health adoption, development of a standard digital health-related competency framework, definition of new accreditation requirements, identification of education and training course changes, establishment of a national digital health knowledge repository, development of a digital health awareness campaign strategy and rollout, design of a monitoring and evaluation (M&E) framework for measuring the effectiveness of engagement, and design of a targeted stakeholder reference and working group.
- ▶ Infrastructure: With activities including identification of underserved areas; development of a data connectivity implementation plan; identification and assessment of ongoing infrastructure projects in underserved areas in partnership with the power and communications sector; definition of minimum computing, power, and connectivity infrastructure requirements for health implementation; and linking of health organization providers' digital health accreditation to meet minimum infrastructure requirements.
- ▶ Solutions (services and applications): With activities including identification of priority services and/or applications, development/revision of requirements and design for identified services and applications, identification of resources to support the expansion and development of solutions, and development/implementation of a collaboration portal.

In most countries, digital health is governed by a range of broader legal and regulatory arrangements, as opposed to narrow digital health legislation. The relevant arrangements typically depend on the nature of the product or service, such as the type of digital health product, and existing laws and regulations that are relevant to the development and use of digital health solutions, such as relevant health laws, data protection and/or consumer protection regulations, cybersecurity regulations, regulations governing IP, etc.

Example: Software as a Medical Device

Software as a medical device (SaMD) describes software intended for medical purposes that perform their role without being part of a hardware medical device (e.g., remote patient monitoring software).

This type of digital health solution poses a regulatory challenge as existing medical device regulations were developed prior to the widespread development of SaMD in the health sector, and the iterative development of such technology poorly aligns with the rigid nature of medical device regulations (O'Driscoll et al. 2024). A specific challenge to both SaMD developers and regulators is how to manage evidence generation supporting the assertion that the solution remains safe each time updates are made to software. To address these challenges, recent SaMD regulations have been developed to be more agile and responsive to the unique nature of this type of digital health technology, including through predetermined change control plans and change protocols, expansion of intended purposes, and provisions for the classification of SaMD based on level of risk (Chhaya and Khamboja 2021; Gov.UK 2021). Regulations are also increasingly adopting a soft-law approach, relying on professional guidelines, real world performance, voluntary standards, and codes of conduct rather than legally binding rules (i.e., hard-law approaches).

Developing an Agile Regulatory Framework

In the context of regulating digital health (a fast-evolving socio-technical ecosystem), there is value in an agile regulatory framework, or so-called *anticipatory regulation*, where regulations are developed more dynamically to keep pace with innovation. The anticipatory approach involves the development of regulations and standards around an emerging field (e.g., digital health) iteratively, with a focus on the impacts on the economy and society of emerging technologies. The growing interest in agile and anticipatory regulation stems from the pace of technological innovation, which challenges more traditional regulatory approaches that are often considered rigid, lengthy, too complex, or inapplicable, thus limiting innovation. The impact of missed opportunities in this regard cannot be quantified; however, the COVID-19 pandemic highlighted the potential value of agile regulation in the health sector. During the pandemic agile changes to the regulatory frameworks related to drug trials and approvals in many countries expedited the development, approval, and reach of COVID-19 vaccines.

The OECD Recommendation of the Council for Agile Regulatory Governance to Harness Innovation, developed based on the regulatory challenges governments face due to the “pace, scope and complexity” of innovation, is highly applicable to digital health (OECD 2025b). The associated guidance document notes the importance of several key activity areas, including developing more adaptive and iterative assessment cycles; considering the international innovation ecosystem to inform the most relevant regulatory approaches; adapting governance frameworks and regulatory approaches to be more forward-looking; enabling a greater exploratory testing and trialing environment to stimulate innovation under regulatory supervision; and, finally, adapting regulatory enforcement strategies and activities to support innovators to navigate the regulatory environment and upholding public protection (OECD 2025b).

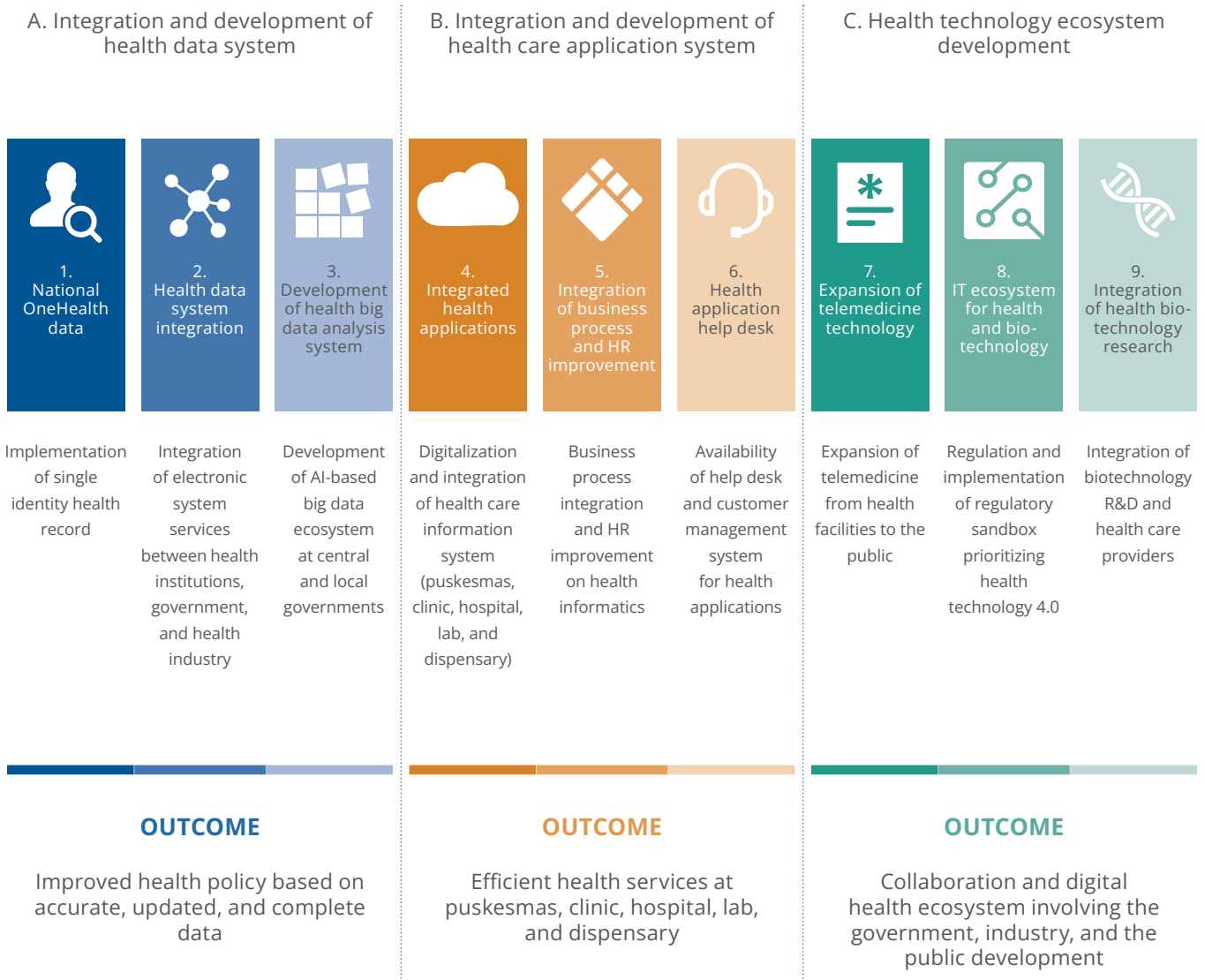
The balance between developing innovative and agile regulatory frameworks while maintaining a robust safety net that safeguards the public and health sector is an important challenge that must be considered in working toward new approaches. The OECD acknowledges also that increased flexibility in regulatory frameworks may lead to trade-offs and other changes to the status quo that will require greater societal buy-in that can be achieved through evidence-based approaches and the building of trust among the public (OECD 2025b). Developing an agile regulatory framework can both support innovation and enable the collection of evidence that can minimize uncertainty on potential risks and benefits (World Bank 2025a).

Policy

National Digital Health Strategies

National digital health strategies are a critical aspect of the governance of digital health as the guiding framework that aligns diverse stakeholders, resources, and technologies toward shared objectives. They may focus on achieving several key objectives that are related to the setup of digital systems but also to health system improvements (Fernandes et al. 2024). Indonesia’s Digital Health Transformation Strategy Blueprint 2024 (illustrated in figure 7 below), for example, outlined how the strategy would improve policy making (e.g., through better use of data enabled by the development of health data systems) and create greater efficiencies in service delivery (e.g., through the development of health information systems streamlining business functions). More targeted policies can also bridge the digital divide by promoting access to technologies and services in underserved and remote areas (World Bank 2023b). For example, government subsidies for telemedicine platforms and investments in rural connectivity ensure that underserved populations are not excluded from advancements in digital health (USDA 2021; Husna and Budiman 2023).

Figure 7: Indonesia Digital Health Transformation Strategy Blueprint 2024—Linking Priority Activities to System Outcomes



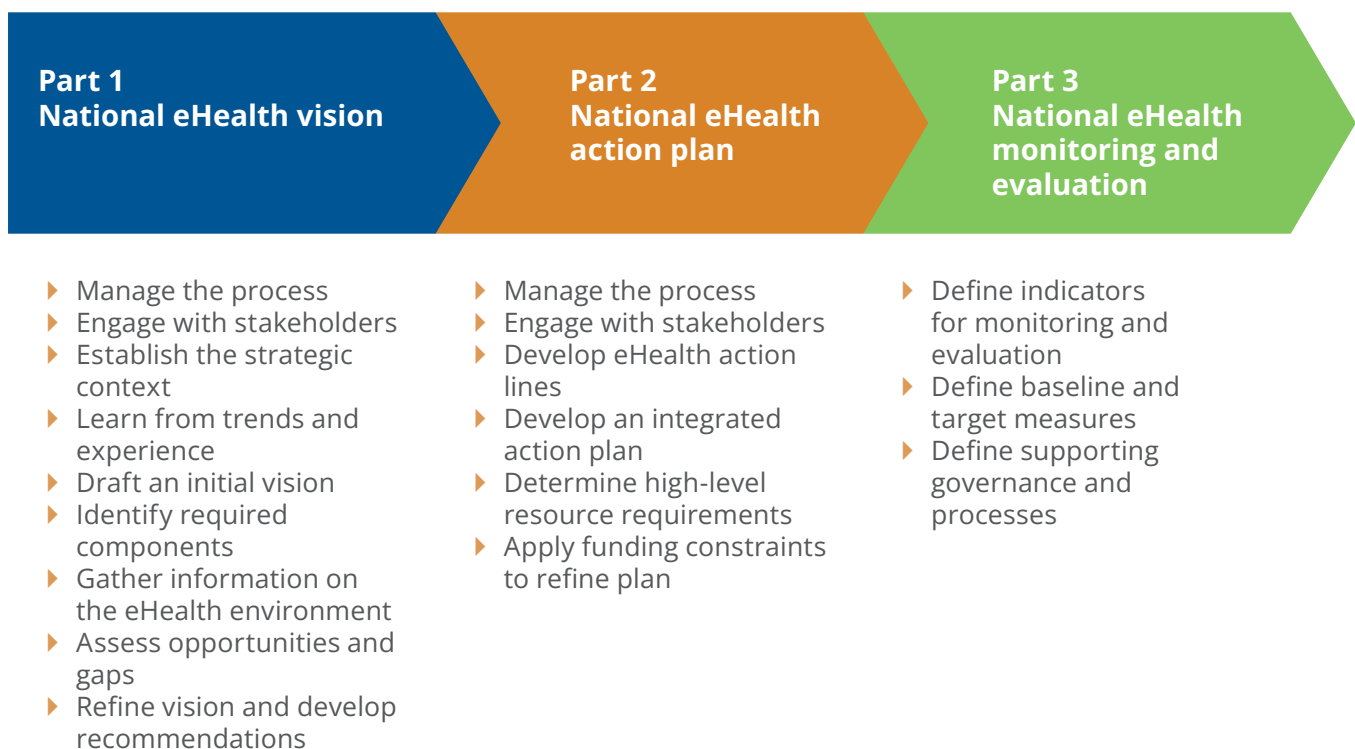
Source: Indonesia, MoH 2021.

Notes: AI = Artificial intelligence; Puskesmas = Community health center; R&D = Research and development.

Resources available to guide countries on the development of digital health strategies include the National eHealth Strategy Toolkit by the WHO (WHO 2012), which provides a structured approach to building digital health systems (see figure 8 below) and the ADB Digital Health Strategy Guide (ADB 2021), which outlines practical steps for developing a digital health strategy. Both guides split the process into three parts: preparation, development, and monitoring and evaluation. Relevant aspects of governing digital health, such as data governance and data privacy, will also be presented and discussed within digital health strategies, including information on the importance of compliance with legal frameworks outside of the health sector (Al Meslamani 2023). Other secondary policies and strategies may also intersect with or be included or discussed in detail as part of a national digital health strategy, including the following:

- ▶ Telemedicine policies, regulating the practice of remote consultations and care delivery (WHO 2019b).
- ▶ Health insurance policies, addressing coverage for digital health services and incentivizing their use (WHO 2019a).
- ▶ National digital transformation or ICT development policies, providing a broader framework for the integration of digital technologies across sectors, including health (Australia, Department of Industry, Science and Resources 2017).
- ▶ Public-private partnership (PPP) policies and frameworks, addressing the country's intent to use PPPs and the guiding principles for the planning of PPP for public service delivery (World Bank Group 2017).

Figure 8: WHO Toolkit for Developing a National eHealth Strategy



Source: WHO 2012.



Development and Implementation of Key Digital Health Policies in Ghana

There are two policy documents driving digital health in Ghana, the **Health Information System Strategic Plan (HISSP) 2022–2025 (Ghana, MoH 2022)** and the **Policy and Strategy on Digital Health 2023–2027 (Ghana Health Service 2023)**. The HISSP outlines how data will be collected, analyzed, disseminated, and what data are collected and why. The Strategic Plan acknowledges that processes need to be digitalized, but some manual processes will also remain. The Policy and Strategy on Digital Health 2023–2027 was developed to improve the coordination of digital health interventions in Ghana and address fragmentation and a lack of interoperability. It outlines how technology can be leveraged to achieve Universal Health Coverage (UHC). The document provides actionable steps to address gaps in the health sector that were identified during the digital health landscape assessment.

Health Information System Strategic Plan 2022–2025

The HISSP 2022–2025 was developed to improve access to quality and comprehensive health data for decision-making. To develop the strategy, all the agencies under the MoH were brought together to develop an outline. While consultants supported outline development, most of the work was done by representatives from the agencies. The process began with a scoping review of relevant documentation and key informant interviews to capture institutional knowledge. A strengths, weaknesses, opportunities, threats (SWOT) assessment was then undertaken to get a baseline. The content of the HISSP was then fleshed out, beginning with the vision and mission. Once a draft was ready, it was shared at agency meetings and at the health summit of the Ministry of Health in 2022 to get the views of a range of relevant stakeholders and build buy-in.

The implementation of this strategy is supported by a strong governance mechanism to support coordination of activities, comprising an Inter-Agency Leadership Committee (IALC). The Policy Planning Monitoring and Evaluation (PPME) and Research Statistics Information Management (RSIM) Directorates of the Ministry of Health supported the implementation of this plan using the Information Monitoring and Evaluation–Technical Working Group (IME-TWG) involving all the key technical officers of the agencies of the MoH to facilitate the coordination of implementation.

The minister of health is the chair of the IALC and responsible for leading, managing, and coordinating the health information system (HIS) and related activities. The IALC is made up of the leadership of all the agencies of the MoH. The committee is responsible for reviewing and ratifying changes for improvements to the HIS. PPME and RSIM, under the MoH, are responsible for coordinating implementation of the activities in the HISSP. The IME-TWG is made up of subject matter experts and responsible for advisory and decision-making on data collection systems and developing and updating standards.

Policy and Strategy on Digital Health 2023–2027

The Ghana Health Service (GHS) agency is the largest service agency of the MoH and is responsible for developing a strategy for digital health that aligns with the National Digital Health Vision. The Policy and Strategy on Digital Health 2023–2027 was developed based on the need for technology to drive health improvements in Ghana. Development of the strategy took inspiration from the global digital health monitor indicators (Global Digital Health Monitor 2025).

To complete a situational analysis ahead of its development, questions were framed around the World Health Organization (WHO) eHealth building blocks, and relevant stakeholders from across the country were interviewed, including individuals at the national, regional, and community levels (WHO 2012). Based on findings from the situational analysis and a desk review, the 10 strategic objectives outlined in the Digital Health Strategy were developed alongside plans for monitoring and evaluation to make sure the document was operational. The strategy was validated at two stakeholder meetings, including at a senior managers' meeting where all senior directors were in attendance. The development team, made up of technical representatives from the various directorates of the Ghana Health Service, the regions, as well as external stakeholders from other agencies of the MoH, worked closely with academia, including Kwame Nkrumah University for Science and Technology (KNUST) and other universities. To encourage regional buy-in, the document was launched in 16 regions to ensure local stakeholders were aware of the strategy and how to implement it. A dashboard was also developed to keep track of how it is being implemented.

The major challenges highlighted by JLN countries in developing a national digital health strategy can be broken down into key areas: political will, regulatory complexity, optimizing human resource availability, and stakeholder involvement (see table 4 below). It is inevitable that challenges will arise during the development of such policy documents, but challenges can be mitigated through careful planning, including through the use of guidance documents such as the WHO National eHealth Strategy Toolkit.

Table 4: Overcoming Common Identified Challenges Related to the Development of a National Digital Health Strategy

Challenges	Example(s)	Reflections
Political will	Lack of high-level political commitment to developing a strategy for digital health.	While it is important to make the case for digital health and a digital health strategy to decision-makers, it is advisable to wait for signs of political commitment prior to engaging in specific activities.
Regulatory complexity	Regulations governing how national policies must be developed make the process quite complicated and lengthy.	As such regulations must be complied with, it is important for those involved in the development of a digital health strategy to understand the requirements and build in sufficient time and resources to develop the strategy in line with them.
	Potential interconnections between a potential digital health strategy and existing regulation (e.g., data protection regulation).	Convening stakeholders prior to the development of a digital health strategy to discuss interrelations with existing regulatory instruments is important to develop a shared understanding and a way forward to ensure the strategy is complementary and does not overstep or complicate existing provisions.
Optimizing human resource availability	Limited time availability among stakeholders to develop the strategy.	Managing availability among stakeholders to develop a digital health strategy can be achieved through the development of appropriate governance structures that enable the sharing of responsibilities among stakeholders. For example, a steering committee and multiple subject-specific technical working groups can be more effective than combining political management and technical expertise in one working group/committee (where there is sufficient country-expertise to split roles and responsibilities).
	Limited financial incentives to encourage participation in digital health strategy working groups.	While there may be sufficient expertise in-country to develop a digital health strategy, experts often request financial incentives to engage in the process, particularly for long-term commitment. However, where there is not the financial flexibility to offer such incentives, outlining the benefits to participating individuals, e.g., skills development, professional networking, publications, and supporting innovation advancement in the health sector for the benefit of the population, can encourage greater willingness to engage.
Stakeholder involvement	Inadequate involvement of stakeholders during the process of developing the digital health strategy.	Limiting the involvement of important stakeholders can have major impacts on the ability to successfully implement a national digital health strategy. While the specific stakeholders that need to be involved will vary by country context, experiences noted by JLN members highlighted the pitfalls of failing to involve stakeholders such as patients and the public, subnational leadership, and the private sector. Undertaking stakeholder mapping at the beginning of the process is therefore critical in ensuring the necessary stakeholder groups can be engaged as soon as possible in the development process.

Source: Authors.

Note: JLN = Joint Learning Network.

Developing New and Updated Policies

To ensure key strategic documents adequately capture emerging technologies, it is important to revise some strategies regularly to ensure they are relevant and keep up with government priorities and the pace of technological advancements. Of course, the precise frequency of updating policy documents will be highly context specific and depend on various factors including the political will, financial resources, and technical expertise to do so. To plug the gap as novel technology emerges, it may also be necessary to create new policies on specific technologies. These should focus on developing cultural understanding on the technology, legal frameworks, organizational governance, and a financing mechanism to support relevant activities under the policy. It is also important for new policies on novel technology to consider integration with existing technologies and systems in the health sector, as well as how systems communicate with other sectors on issues relevant to health (e.g., communication with agriculture or water and sanitation systems when it comes to zoonotic diseases as part of working toward OneHealth).

Policy Coordination Bodies

Most commonly, the Ministry of Health is responsible for developing a national digital health policy that aligns with national health care priorities and for securing funding for its implementation (WHO 2012). However, the specific entity responsible for developing digital health policy depends on the institutional arrangements adopted by the country (outlined below in the Institutional Leadership section). In all cases, the responsible entity will work closely with other parts of government, as well as the private sector and civil society to realize its digital health strategy. Besides government bodies, developing and coordinating bodies that may also play a role in digital health policy development include the following:

- ▶ International organizations like the WHO, the International Telecommunication Union (ITU), and the World Bank provide guidance, funding, and technical assistance to countries developing digital health strategies (ITU 2025; World Bank 2023b). For example, the WHO's Global Strategy on Digital Health provides guidance and strategic directions, promoting universal health coverage through digital innovation (WHO 2021).
- ▶ Nongovernmental organizations (NGOs) and research institutions contribute to the development and implementation of digital health policies by providing research, evidence-based insights, evaluation frameworks, and capacity-building support to governments and stakeholders to guide policy development.
- ▶ Private sector and technology companies, including technology firms and start-ups, play a critical role in developing and deploying digital health solutions. Policy makers often collaborate with these entities to ensure that policies are grounded in technological feasibility and market realities (Philips 2021; Transform Health 2022). In countries where private providers play a large role in health service provision, this can ensure digital health solutions are locally viable and integrated with existing systems. Innovation schemes (e.g., regulatory sandboxes) that involve the private sector can similarly bring the private sector into policy development.
- ▶ Civil society and patient advocacy groups can play a vital role in ensuring that digital health policies are developed to consider the role of the patient in digitally enabled health care delivery. By voicing the needs and concerns of diverse populations, they help shape policies that are equitable and inclusive (Popa et al. 2024; FCGH Alliance 2024).

Institutional Leadership

An Overview of Institutional Models

The Broadband Commission has proposed three different institutional models for governing digital health, which should be viewed as points on a spectrum rather than rigid models (see figure 9 below). Institutional models describe the primary public entity responsible for driving the development of national digital health strategy and setting priorities and road maps for achieving the strategy. Over time, countries may modify their choice of model depending on the specific context, circumstances, and stakeholders. Depending on its needs, a country may choose to stay with a single model, combine elements of different institutional models, or adopt a hybrid approach. Even where institutional leadership on digital health is decentralized from the MoH, the MoH typically maintains a central role in regulatory functions such as policy making, coordination, and standard setting (Marcelo et al. 2018). A deep dive on the institutional models from five countries (Brazil, Finland, Ghana, India, and Rwanda) recently published by John Hopkins Bloomberg School of Public Health provides an in-depth view of how institutional models function in practice, including variations in approaches within each model (Johns Hopkins Center for Global Digital Health Innovation and the Digital Health Exemplars Research Consortium, Forthcoming).

The *Health Ministry Mechanism* model is the most commonly found institutional model, with the defining characteristic that both strategy development and technical activity is driven by MoH. Of the JLN countries that follow a Health Ministry model, two subtypes emerge: (1) digital health is driven by the MoH, through a responsible committee, unit, or department; and (2) digital health is driven by the MoH, but there is more than one responsible committee, unit, or department.

Figure 9: Broadband Commission's Institutional Models for Governing Digital Health



Source: Broadband Commission 2017.

Notes: MoH = Ministry of Health; ICT = Information communication technology.

Under the *Government-Wide Digital Agency Mechanism* model, an intragovernmental technology agency provides ICT services to all ministries. The MoH drives the digital health strategy and programs but acts as a client of the government-wide technology agency. The defining characteristic of a government-wide digital health model is a digital agency that provides shared ICT infrastructure and implementation expertise for all government entities. This model provides a common set of standards, policies, and guidelines, including interoperability standards, data security and confidentiality standards, service, software and hardware components, data centers and data management capabilities, cloud services, and technical capacity.

In the *Dedicated Digital Health Agency Mechanism* model, the health and ICT policy and strategy is often led by the MoH and a cross-sector ICT ministry or agency. The defining characteristic of the dedicated digital health agency model, and a key difference with the Health Ministry model, is that it operates as an independent unit, with dedicated capacity and resources and an explicit role in coordinating digital health efforts.

Advantages and Challenges of Different Institutional Models

There are potential advantages and drawbacks to each of the high-level institutional models, as well as considerations regardless of the model, as illustrated in table 5. As part of the governance of all models, an operational digital health governance framework needs to reflect the power relations and lines of accountability between the different stakeholders; as such, establishing the high-level institutional model is one of the first steps to be taken (Marcelo et al. 2018). The Broadband Commission highlights several advantages and drawbacks to each of the three models, which are supplemented below with nuanced reflections provided by JLN members for this report as well as deep dives on institutional arrangements in recent work published by Johns Hopkins Bloomberg School of Public Health (Johns Hopkins Center for Global Digital Health Innovation and the Digital Health Exemplars Research Consortium, Forthcoming).

The major challenges of the *Health Ministry Model* may be overcome with careful consideration and planning. One approach identified by ADB and discussed by JLN members to ensure intergovernmental cooperation is the development of steering committees, technical working groups (TWGs), and strong program management with representatives from each ministry. JLN members who had set up steering committees or TWGs highlighted the importance of setting clear roles and responsibilities for members, as well as lines of accountability. Asia eHealth Information Network's (AeHIN's) Convergence Workshop approach exemplifies this process in action. The workshops are country government-led and bring relevant stakeholders together to collaborate and build multisectoral coherence in development of a vision for national digital-in-health programs. Workshop objectives vary from country to country based on progress made to date and priorities outlined by governments and stakeholders (Digital Health Convergence Workshops 2025).

For building and sustaining technical capacity, the MoH can engage resources, skills, and knowledge from the private sector, civil society, academia, expert bodies, or other government entities, through mutually beneficial partnerships, to execute the national digital health strategy and solutions. Such partnerships can be as diverse as the setup of knowledge-sharing hubs, technologically specific collaborations, and exchange programs for staff.

A Government-Wide Digital Agency provides opportunities for collaboration and shared investments across ministries, including in ICT infrastructure and technical expertise. However, research into digital health governance models developed by Johns Hopkins, found several disadvantages related to the government-wide agency model in Rwanda, where digital health governance is steered by the Ministry of ICT's operational arm, the Rwanda Information Society Authority (RISA), via a network of chief digital officers (CDOs) who are placed in relevant ministries and agencies, including the MoH. These disadvantages align with the challenges presented by the Broadband Commission and include concerns with the government-wide approach limiting commitment to, and understanding of, health sector-specific needs, and competing interests among development partners that the government collaborates with on digital health, leading to concerns around fragmented priorities, ability to execute large-scale digital health initiatives, and limited engagement with the private sector. To address such challenges, the Broadband Commission notes the importance of embedding teams to strengthen communication and cooperation between the MoH and the ICT agency (Broadband Commission 2017). In the context of Rwanda, authors of the Johns Hopkins report suggested potential misalignment of priorities across ministries and departments can be avoided by considering the establishment of a single digital health authority responsible for overseeing all digital health initiatives that works closely with the CDOs and RISA (Johns Hopkins Center for Global Digital Health Innovation and the Digital Health Exemplars Research Consortium, Forthcoming).

As for a Dedicated Digital Health Agency, while the Broadband Commission highlights the challenge of maintaining financing over time, as it is easy for governments to defund independent arms-length agencies, it is notable that, assuming rule of law is effective, maintaining financial security largely depends on how budget is set and who has power to change it. For example, such a unit could be created through legislation with a funding allocation over 10 to 20 years. Defunding this institution would require changing the law, typically requiring parliamentary approval, which makes defunding the organization difficult. Similarly, appropriate legislation, as well as having clear transparency and accountability mechanisms, can also address the challenge of establishing credibility and accountability highlighted by the Broadband Commission. Beyond credibility, the setting-up of a digital health agency can lead to a tussle between MoH and the agency responsible for digitization, specifically with sensitivities around budget line items and data ownership and the need for data sharing.

A new challenge identified by deep dive research on the institutional model in Brazil, where the dedicated digital health agency model has been adopted, relates to understanding changes in national strategy. The Brazil deep-dive notes that as some digital health interventions and priorities had been implemented prior to the establishment of Secretaria de Informação e Saúde Digital (SEIDIGI) as a formalized secretariat in 2023, some programs and platforms are still managed by different secretariats within MoH (Johns Hopkins Center for Global Digital Health Innovation and the Digital Health Exemplars Research Consortium, Forthcoming). The authors highlight potential challenges with coordination and prioritization due to the complexity of management responsibilities. So, such challenges may arise from changes to national strategy and from poor integration of existing initiatives and ways of working from existing national strategy when establishing a dedicated digital health agency model.

Table 5: Advantages and Drawbacks of Different Institutional Models

Institutional model	Advantages	Drawbacks
Ministry of Health	<ul style="list-style-type: none"> Easier alignment of digital health strategy with national health strategy based on in-depth knowledge of national health priorities within MoH. Reduces potential confusion and/or competition in areas relevant to digital health that can occur across sectors and ministries. 	<ul style="list-style-type: none"> Intergovernmental cooperation across sectors and ministries. Technical capacity, as existing capacity within MoH capacity may be limited. Leadership within MoH can result in shifting priorities.
Government-wide digital agency	<ul style="list-style-type: none"> Digital agency provides opportunities for collaboration and shared investment between MoH and others. National digital architecture can unify legacy information systems or phase out systems built for purposes or priorities no longer relevant. Shared digital infrastructure can facilitate cost savings through economies of scale. 	<ul style="list-style-type: none"> Centralization of responsibility can create resistance among sectors/ministries. Risk of poor alignment and coordination between the MoH and digital agency. A lack of health sector-specific knowledge can hinder the ICT agency's ability to capacity build and train health sector staff. Limited focus on health sector priorities.
Dedicated digital health agency	<ul style="list-style-type: none"> Digital health strategy and plan developed by a dedicated agency serves as a common reference for implementation across government units. Downstream impacts of cross-unit strategy and plan include enabling interoperability, having a clear architectural framework, and clear protocols for vendors and partners. Typically less impacted by leadership changes within MoH as agency and its functions are independent. 	<ul style="list-style-type: none"> Requires long-term vision and sustained investment, which can be as much a challenge for the dedicated digital health agency as it is under the MoH. The costs associated with setting up and sustaining new agencies can be off-putting for governments. Potentially difficult to establish authority, credibility, and accountability. Can result in a tussle between Ministries of Health and the agency responsible for digitization. May be unaware of planned or realized changes in national health strategy. May not understand the functional requirements for digital health solutions (if clinical professionals not employed in the agency). Impact of expertise outside of MoH may lead to lack of awareness and skills within the MoH, delaying the adoption and implementation of the digital health strategy.

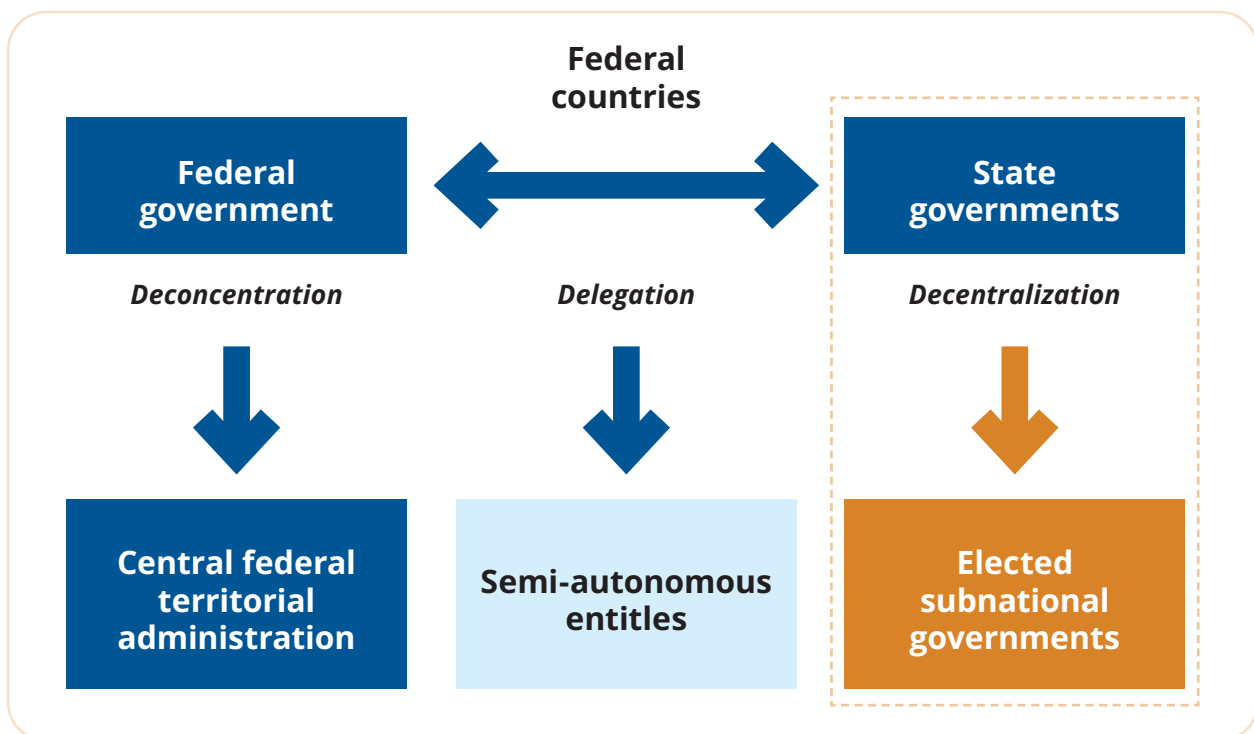
Source: Authors.

Notes: MoH = Ministry of Health; ICT = Information communication technology.

Governance Approaches in Federated States

Multilevel governance refers to the system that supports policy and decision-making among national, regional, and local governments. When these levels of government work well together, policies are more likely to succeed, fostering development in all places.⁵ In federated countries, sovereignty is shared between the federal government and self-governing regional entities (federated state governments), which may have their own constitution, parliament, and government (see figure 10). In a federation, the self-governing status of the component states may not be altered by a unilateral decision of the federal government. In general, federal governments have exclusive and defined responsibilities such as foreign policy, defense, money, and the criminal justice system, while federated state governments have extensive competencies (OECD 2019b). The status, organization, responsibilities, and financing of local governments within federated states are defined by state constitutions and laws and often differ from one state to another. Local government reforms are decided by the federated states and not the federal power.

Figure 10: Defining Decentralization in Unitary and Federal Countries



Source: OECD 2019b.

There is mixed evidence on the role of decentralization on the health sector and health outcomes. Previous research on the topic identified a statistically significant effect of administrative decentralization on health expenditure and life expectancy, with findings showing that a moderate degree of decentralization reduces public health spending and increases life expectancy, but excessive decentralization was associated with higher public spending and lower life expectancy (Dougherty et al. 2022). Research assessing the impact of decentralization across WHO's six building blocks of the health system⁶ found that most quantitative data showed a predominantly positive effect of decentralization, whereas qualitative data provided a more mixed picture, including on the governance building block (Cobos Muñoz et al. 2017). An increase in community participation in health was one of the most reported positive findings. This finding was echoed in further research that mapped the positive and negative impacts of decentralization on the health sector across leadership and governance and human resources for health (Sapkota et al. 2023). Some positive features included improved community engagement and participation and better stakeholder engagement in local-level planning.

Among the possible downsides of decentralization are coordination problems between the central-level and local authorities, lack of clear delineation of responsibilities between levels of government, delays in health resource transfer, limited autonomy by local governments, ineffective policies, low transparency and accountability in budgeting and expenditure, and insufficient monitoring. With respect to health financing, subnational governments rely extensively on transfers from central governments to fund their budgets, and devolution partly leads to fragmentation of the pooling function with implications for equitable distribution subnationally (WHO 2022). At the same time, subnational governments have limited capacity to act as strategic purchasers of health services (WHO 2022). A second report on public financial management found that devolution resulted in budget structures that limited collaboration across government, leading to disjointed and duplicate planning (OECD 2019b).

The diffusion of governance responsibilities in federated states requires special consideration in the context of digital health. Federated governance enables countries to connect more closely

with the needs of populations, with locally elected representatives and governments free to choose how they serve their constituents. This can in turn lead to a more population-centric approach to the development of digital health strategy and interventions. It also enables countries to draw from a wider pool of stakeholders to share experiences and lessons learned from across states. Nonetheless, the devolution of responsibilities can result in disconnected governance (e.g., where national and subnational governance models may be at odds), unfunded mandates (e.g., where there is a requirement to do something without the funding to do it), challenges managing shared services across jurisdictions (e.g., infrastructure), inadequate state representation in the development of national strategic direction and decision-making, and duplication of efforts, and possible inequalities in health outcomes due to differences in digital health offerings.

Federated Governance of Digital Health in India



India is a multiparty federal republic with powers divided between the Union and state governments. Three lists in the constitution outline the areas where each entity can legislate. The Union list grants exclusive powers to the Union government, the state list is reserved for state governments, and the concurrent list allows both levels to legislate with central laws taking precedence in case of conflict. Public health is a state subject.

The National Health Authority (NHA) is a governmental agency, under the Ministry of Health and Family Welfare (MoHFW), responsible for leading implementation of the flagship program in digital health, Ayushman Bharat Digital Mission (ABDM). The NHA is responsible for coordinating with MoHFW and other state bodies. Its Mission Steering Group is the supreme decision-making authority for ABDM.

To support states, the NHA has developed strategic guidance to drive state adoption of ABDM, including a road map for statewide implementation, guidelines for setting up state office and hardware guidelines. The NHA also provides financial support: Rs 500 crore (US\$58 million) (Ministry of Health and Family Welfare, India 2024d) for human resources and Rs 140 crore (US\$16 million) for information, education, and communication and capacity building. States are incentivized through the Digital Health Incentive Scheme (DHIS) (ABDM 2022a), as well as by receiving an initial outlay (Rs 500 million [US\$5.8 million]). Beyond providing funding for capacity building, the NHA undertakes a range of training and capacity-building activities with states, including the following:

- ▶ Workshops for joint directors
- ▶ Regional Training of Trainers (TOTs)
- ▶ Cross-learning workshops
- ▶ State-level capacity-building workshops

Finally, state-level grievances are addressed through a monthly Senior Management Department (SMD) review, dedicated points of contacts (PoCs) for state-specific concerns, and continuous engagement to identify and address pain points. At the state level, ABDM implementation is facilitated by state ABDM offices. State offices have full operational autonomy over implementation of ABDM activities. It is expected that states will do the following:

- ▶ Establish a governance structure (e.g., state office and Program Management Unit [PMU]).
- ▶ Populate ABDM registries (e.g., Ayushman Bharat Health Account [ABHA], Healthcare Professionals Registry [HPR], Health Facility Registry [HFR]).
- ▶ Implement ABDM-enabled health management information system (HMIS).
- ▶ Integrate state health programs/solutions with ABDM.

In terms of needs from the Union government (NHA), each state is different. For the most part, states can be put into three categories. There are those that are advanced digitally, with legacy systems that require integration; there are those that have little-to-no digital systems and want to start afresh; and, in between, there are those with online/offline systems that must decide whether to leave behind existing systems and build something fresh or try to adapt what they have. The NHA offers assistance to states, specifically to find and build a system and financial resources to establish a digital health office. For more advanced states, help is more focused on the integration of systems (e.g., technical assistance).



Federated Governance of Digital Health in Nigeria

Nigeria is a federal nation where state and local governments are primarily responsible for providing primary and secondary health care services. As such, an inclusive national digital health strategy that considers federal, state, and local priorities is critical to the success and uptake of digital health initiatives.

The Nigeria National Council on Health (NCH) is responsible for ownership and oversight of the digital health strategy, currently the 2015–2020 National Health ICT Strategic Framework (Nigeria, MoH 2016). The framework's governance structure includes four major roles: Health sector leadership (National Council on Health), Health ICT Steering Committee to provide strategic direction and support, Health ICT Project Management Office to provide operational management and support, and Health ICT Technical Working Group to provide technical assistance on relevant topics.

At the state level, the proposed governance structure is the State Health ICT Steering Committee composed of commissioners of health and communication technology/science and technology and heads of state government agencies. Their role is to provide strategic direction and management within their respective states.

During the development of the Strategic Framework, state representation was critical to its success. Two representatives from state MoH and a technology representative from each state government were invited to work on the policy's development and support presentation of the strategy to the National Council on Health (Broadband Commission 2017).

Choosing between Different Institutional Models

There is no one optimal institutional model. The Health Ministry, government-wide digital agency, and dedicated digital health agency models each have their strengths and limitations, which vary across country contexts, and even in stages of maturity and implementation. For example, where a country has adequate fiscal space to do so, the successful development of a dedicated digital health agency could cultivate clear ownership, a long-term vision and investment strategy, as well as enable interoperability, a clear architectural framework, and clear protocols for vendors and technology partners. It would also have the necessary in-house human capacity and technical knowledge. However, the creation and setup of such an agency would need to occur alongside the development of digital health expertise within the MoH to ensure the ministry is able to understand and contribute to decision-making, and that outputs from the digital health agency align with national health priorities.

Often an institutional model is selected based on the vision of authorities in power, but this is not the optimal approach, as selection should be based on the context and suitability of the models. There are several possible considerations that can help policy makers determine the best-suited institutional model for a given national context (see tables 6 and 7 below). The questions outlined below provide some of the key areas that can be considered part of the process of selecting an institutional model, though additional context-specific considerations will also likely be relevant. Table 6 further outlines the relevance of each question to the selection of an institutional model and what implications the response has on selection. Table 7 further simplifies which institutional models may be more or less suited to a given situational context, though these reflections are speculative based on discussions between JLN members during the development of this report and are not based on existing evidence (beyond expert opinion). Governments should be pro-active in seeking to understand what is most appropriate for them and should then take action to set up the selected model.

Table 6: Tentative Considerations for Selecting an Institutional Model

Questions	Relevance	Implications (to illustrate)
What is the level of decentralization with respect to matters related to digital health? ^a For example, which level of government has responsibility for (1) health care planning; (2) health care provision; (3) health financing; (4) digital infrastructure in health?	Decentralized countries typically require more complex governance structures, as there is need for collaboration and coordination across levels of government and across responsibilities.	Existing models and approaches for coordinating across levels of government in health should be considered when choosing an institutional model for digital health. The inherent complexity of governance in decentralized countries might suggest a preference for simpler governance models for digital health, if possible.
What is the level of political instability? ^b For example, does the country score well on political stability?	The likelihood of political instability should be considered when choosing a governance model for digital health as this may determine how stable and sustainable it will be.	Countries with a higher likelihood of political instability might consider adopting a legally mandated, dedicated digital health agency model with ring-fenced financing for a certain period (e.g., five years), although enforcement could be undermined by weak rule of law.
What is the level of corruption and control of the rule of law? ^c For example, does the country score well on control of corruption and rule of law?	The level of corruption and respect for rule of law in the country should be considered when choosing a governance model for digital health as this may determine how stable and sustainable the setup of an institutional model for digital health will be.	Countries with a weak rule of law and high corruption might consider adopting the Ministry of Health or government-wide agency models as a dedicated digital health agency with ring-fenced funding for a certain period may be undermined by corruption and misuse of funds.
What broadly is the regulatory quality and government effectiveness? ^d For example, does the country score well on regulatory quality and government effectiveness?	The level of regulatory quality and government effectiveness in the country should be considered when choosing a governance model for digital health as this may determine the ability to set up new governance structures and entities.	Countries with challenges around regulatory quality and government effectiveness will likely struggle with setting up an institutional model for digital health more generally. However, they might consider adopting the Ministry of Health model as the setup of a new dedicated digital health agency may require the passing of new legislation/regulations that may not be possible. Similarly, a government-wide agency model may be a challenge to develop as coordination across government may not be feasible.
What is the existing state of play of eGovernment? For example, does the country score well on the development and adoption of eGovernment initiatives?	The maturity of eGovernment strategies and implementation of initiatives are likely to have expertise outside of the health sector that may inform the selection of a specific institutional model for digital health.	Countries with existing eGovernment strategies and implementation of initiatives are likely to have existing infrastructure and expertise outside of the health sector that may lend themselves to selecting the government-wide agency model. However, this would not preclude the country from selecting either of the other digital health institutional models.
What is the level of digital maturity in general and in the health sector specifically? ^e For example, does the country score well on digital literacy and digital public infrastructure? Does the health sector have digital technology for health service delivery and connected digital systems?	Digital maturity levels should inform investment priorities and timelines, which in turn may benefit from some governance models and not from others.	Countries with lower levels of overall digital maturity (e.g., limited infrastructure, poor digital literacy, etc.), or with limited digital technology use within the health sector might consider adopting a government-wide digital agency model in the short to medium term so that they can focus on establishing the foundations for a digital transformation in health.

Questions	Relevance	Implications (to illustrate)
What is the existing level of human resource management related to digital health? For example, what relevant cadres of workers (and how many) are working in the health sector (e.g., ICT professionals, data analysts, health informatics specialists), and how many of these work outside the health sector (e.g., private sector)?	The level of human resource availability and management relevant to digital health can have a significant impact on the choice of the digital health institutional model as appropriate expertise and staffing must be put in place for it to work effectively.	Countries with most digital health (including technical) expertise outside of the public sector might consider a government-wide digital agency model, while those with sufficient expertise within the MoH may consider the Ministry of Health model.
What are the existing key entities and stakeholders related to digital health? For example, what institutions already exist (e.g., health regulator, data regulator, telecom regulator), who are the key players (e.g., providers, payers, private sector)?	The existence and status of institutions (e.g., is the institution well-staffed and resourced?) related to digital health can naturally have a significant impact on the choice of digital health institutional model.	Countries that already have a number of institutions in place will need to consider how those legacy institutions will fit into a new (adapted or created) governance model.
What level of political support exists for the development of an institutional model for digital health? For example, is there already support for setting up a model, and is there a proposed approach and timeline for its development?	The level of political support for the development of an institutional model for digital health can have a significant impact on the choice of model (e.g., if decision-makers are already clear on the model they want to pursue, or if they have a specific timeline for development).	Countries where there is no political support for the development of an institutional model for digital health should seek to build support before moving forward. In countries where decision-makers have already determined which digital health institutional model they want to pursue are unlikely to be able to change direction but can be presented with information on which models may be more suitable for the context.
What is the fiscal space in your country to fund digital health initiatives?	Financing is crucial to ensure the feasibility and sustainability of digital health investments. It is also crucial for establishing and maintaining digital health governance models.	For example, countries with limited fiscal space and significant financing constraints might consider adopting either the Health Ministry model or the government-wide digital agency model, as a dedicated digital health agency model would likely not be financially viable.
What are the country's main development goals in general, and in the health sector more specifically?	Different governance models could be effective at supporting the attainment of a country's development objectives. The choice of governance model should thus be informed by those objectives.	For example, a country seeking to build digital public infrastructure might benefit from adopting a government-wide digital agency model, while a country that aims to build institutional and human capacity in the health sector might benefit more from a dedicated agency that can better meet the needs of the health sector.

Source: Authors.

Notes: MoH = Ministry of Health; ICT = Information communication technology.

a. See, for example, Cobos Muñoz et al. 2017.

b. See <https://www.worldbank.org/en/publication/worldwide-governance-indicators>.

c. See <https://www.worldbank.org/en/publication/worldwide-governance-indicators>.

d. See <https://www.worldbank.org/en/publication/worldwide-governance-indicators>.

e. See, for example, digital maturity assessments (World Bank 2023c).

Table 7: Stylized Matrix of Potential Institutional Models Based on Relevant Considerations

Considerations when selecting an institutional model for digital health governance		Ministry of Health model	Government-wide digital agency model	Digital health agency model
1	High risk of political instability	Less suited	Less suited	Neutral
	Low risk of political instability	More suited	More suited	More suited
2	High level of corruption	Neutral	Neutral	Less suited
	Low level of corruption	More suited	More suited	More suited
3	High level of regulatory quality and government effectiveness	More suited	More suited	More suited
	Low level of regulatory quality and government effectiveness	Neutral	Less suited	Less suited
4	High level of digital maturity	More suited	More suited	More suited
	Low level of digital maturity	Less suited	Neutral	Less suited
5	High level of digitally relevant human resources in the health sector	More suited	More suited	More suited
	Low level of digitally relevant human resources in the health sector	Less suited	More suited	Neutral
6	High level of commitment to eGovernment initiatives	More suited	More suited	More suited
	Low level of commitment to eGovernment initiatives	More suited	Less suited	Less suited
7	High level of fiscal space for digital health	More suited	More suited	More suited
	Low level of fiscal space for digital health	Neutral	Neutral	Less suited
8	Developing digital infrastructure as a development goal	Neutral	More suited	Neutral
9	Building institutional and human capacity in the health sector as a development goal	More suited	Less suited	More suited
10	Level of decentralization	Seek to understand how the models will work based on the level of decentralization, and avoid a model that will add too much complexity		
11	Many entities and stakeholders	Seek to understand how the models will interact/engage with relevant entities and stakeholders before selecting		
12	Level of political support	Seek to build political support for digital health before moving forward with institutional model selection/where support exists, provide guidance to decision-makers on what model or hybrid approach is best suited for the context		

Source: Authors.

Central Digital Health Agencies in Decentralized Governance Structures

Central Digital Health Agencies within decentralized governance structures face greater complexities in implementing digital health and related strategies, as well as facilitating coordination. In India, the implementation of the National Digital Health Mission (NDHM, later named ABDM) strategy recognized the need to coordinate across ministries and create institutional mechanisms that connected states to the agenda (National Digital Health Mission 2020). Given that early implementation needed to be accepted and implemented by state/Union Territory (UT) governments, close coordination was needed to maintain a federated architecture and public health care schemes, with support from other entities at the federal government level. A nodal officer within the Health Ministry in each state was appointed for ABDM support, and during the expansion phase, states and UTs were expected to establish a governance structure. The National Health Authority (NHA) recommended an organization structure for digital health mission teams headed by a state mission director leading a team of joint directors for coordination, IT, and administrative matters. The NHA took on five key areas of effort to drive state adoption including strategic guidance, financial support, training and capacity-building, incentivization, and grievance redressal. Strategic guidance included a road map for statewide implementation and guidelines for setting up a state office and hardware. NHA further provided training support through workshops for joint directors, regional training of trainers, and state-level capacity-building workshops. Grievance redressal efforts included monthly state mission director reviews, dedicated points of contact for state-specific concerns, and continuous engagement with states to identify and address pain points. Nonetheless, the level of implementation has varied from state to state. As of July 2024, 34 of 36 states/UTs have adopted ABDM, and 31 have onboarded a Program Management Unit (PMU) for the implementation and operation of mission activities in the state (India, MoHFW 2024c; National Health Authority 2022a). The political will and commitment from state-level leadership have been noted as critical in facilitating uptake but leave the federal government with limited power to drive uniform adoption of ABDM.

In Brazil, different challenges have been noted regarding the positioning of responsibilities for the digitalization of primary health care (PHC) at the municipal level, leading to diseconomies of scale and creating challenges for small municipalities, particularly on human and technical capacity (OECD 2021). While in India 28 states and eight Union Territories are involved in decentralized decision-making, in Brazil there are more than 5,500 municipalities. An OECD report suggested a new model of shared services, building on existing institutions and experiences. Shared services describe regional health authorities bringing together smaller jurisdictions (e.g., municipalities) and providing shared services to all members to achieve both economies of scale and missing human resource expertise (OECD 2021). The report proposed the setup of dynamic purchasing systems at the federal level, with appropriately funded agencies at the state or regional levels empowered to provide the municipalities with specialized human resources, as well as purchasing and management services for digital PHC. However, the shared services model could be considered beyond primary care. The report further notes that in the Brazilian context, shared services could be aggregated at federal government level, state government level, or health macro-regions and regions, depending on the specific gap being considered. Again, the importance of coordination and commitment from leadership at the subfederal level is integral to the success of such proposed approaches.



Realizing the Components of the Nigeria Digital in Health Initiative Memorandum Across States in Nigeria

In March 2024, the federal government inaugurated a 20-person committee for the implementation of the Nigeria Digital in Health Initiative (NDHI), chaired by the honorable minister of state for health and social welfare. The committee will oversee the development of a national digital health environment, supporting the scale-up of digital health interventions, including a national unified electronic medical record (EMR) platform in the first instance. The approved memorandum “The Adoption and Implementation of Nigeria Digital in Health Initiative at the National and Subnational Levels” paves the way for the national rollout of the NDHI and its components at the federal level and across the 36 Nigerian states. A critical aspect of realizing the scale-up of digital health interventions outlined in the memorandum is to advance state and subnational ownership of the agenda.

As part of efforts to advance state and subnational ownership of the NDHI agenda, a state-level mapping of digital health has commenced. This was followed by a series of virtual consultations with commissioners who are decision-makers at the state level, and focal persons nominated by the commissioners in each state. A decision-making workshop was also organized with all relevant stakeholders to discuss potential institutional models and coordination mechanisms, share terms of reference (TORs), and agree on next steps. The workshop will also discuss early ideas on the technical aspects of the agenda, including the health information exchange architecture by sharing initial thinking from the federal government on what this could look like in practice. This consultative approach is important to secure buy-in of the states.

The successful implementation of digital health interventions hinges on the active participation and commitment of state and subnational entities. By engaging state-level decision-makers and stakeholders through a structured consultative process, the digital health agenda is aligned with local needs and priorities. This collaborative effort will not only foster ownership but also enhance the sustainability and effectiveness of digital health initiatives. It is imperative that support and buy-in is garnered from the states to create a cohesive and integrated digital health ecosystem that benefits all citizens.



Picture 1: NDHI Consensus-Building Event



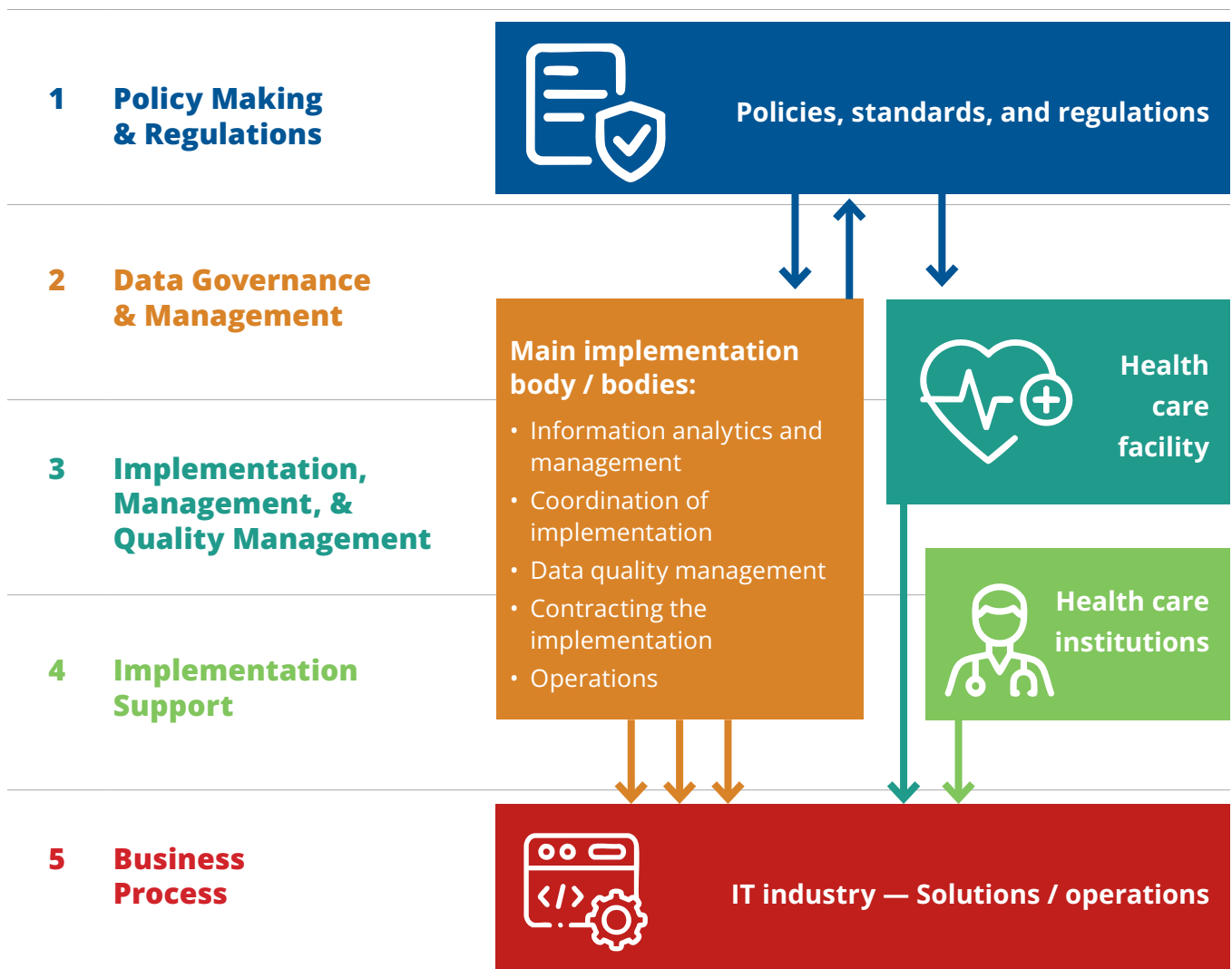
Picture 2: Stakeholder Consultation with State Commissioners of Health

Operationalizing Stakeholders Within the Institutional Model

The World Bank *Digital-in-Health* report notes that there are five layers of digital health leadership, the first of which can be considered in the context of functions and roles within the institutional model (World Bank 2023b). Each of the five layers (see figure 11 below) must be institutionally distinct from each other to ensure separation of responsibilities, technical excellence, and accountability. When considering the institutional model driving digital health governance in a specific national context, the entity responsible for policy making and regulation must be engaged with stakeholders who bring the relevant knowledge and skills that enable successful implementation and management across the digital health ecosystem and the five layers.

Within the policy making and regulation layer, the responsible entity within the institutional model can seek to synergize with each of the additional layers by developing and using a common regulatory and standardization framework. Further, they must provide the overall vision, strategic plans, standards, and basic regulations to facilitate implementation within the other layers.

Figure 11: Five Layers of Digital Health Governance Implementation and Management



Source: World Bank 2023b.

Notes: IT = Information technology.

Once an institutional model has been defined, functions, roles, and responsibilities based on the requirements pertaining to digital health will need to be defined. Key functions will be based on the remit of digital health governance at that point in time. Once the key functions of the entity have been defined, the required stakeholders, their expertise, skills, and qualifications, and how different stakeholders will interact, including reporting and escalation mechanisms, should all be outlined and agreed upon. It is preferable to develop documentation to solidify what has been agreed, including the following (Baret et al. 2013):

- ▶ Definition of roles and responsibilities, including development of reporting lines, and who is responsible for risk management, financial and regulatory reporting, public disclosures, and crisis preparedness and response.
- ▶ Definition of functions and types of activities under the remit of the entity as pertaining to digital health.
- ▶ Linkages between key stakeholders and relevant external entities and their stakeholders.
- ▶ Methods for escalating and reporting significant matters.

A RACI (Responsible, Accountable, Consulted, and Informed) matrix (see figure 12 below) is an example of a tool that enables entities to define roles and responsibilities and specify cross-functional collaboration, as well as develop, revise, and enhance a risk management framework and the internal controls that will enable and embed sustainability (KPMG International 2024). Such management tools can aid both new entities in developing roles and responsibilities and existing entities that require new roles and responsibilities to be drawn up to enable the functions related to digital health.

Figure 12: Example of a RACI Matrix to Help Define Functions and Roles in a Governance Model

RACI Chart (Roles and Responsibilities Matrix)

Process Name / Description:

Created On: Revision:

Created by:

	Function A	Function B	Function C	Function D	Function E
First Responsibility					
Second...					
Third...					
Fourth...					
Fifth...					
Sixth...					

R = Responsible, A = Accountable, C = Consulted, I = Informed

Source: TemplateLAB 2016.

Note: RACI = Responsible, Accountable, Consulted, and Informed.

Governance of Human and Financial Resources

Human Resources

Given the substantial human resources for health (HRH) shortage globally, human resource management (HRM) is a vital topic. The HRH action framework, developed by representatives of multilateral and bilateral agencies, donors, and partner countries, led by WHO and USAID, provides six action areas with targeted intervention areas to enable an effective response to HRH challenges (WHO 2017). The framework highlights increased basic leadership skills, workforce skills training, policy development, financing for health workforce development, coordinating relevant stakeholders, and mobilizing resources through workforce planning and management (Effa et al. 2021). A digital transformation in the health sector requires an advancement in skills, the reorganization of health service delivery, and updates to related legal and financial frameworks (Socha-Dietrich 2021).

HRM for digital health is an important element of digital health governance as the successful use of digital solutions within the health sector relies on workforce skills, capabilities, and preferences. It is essential that stakeholders involved in the development, management, and use of digital health can see its benefits to their job function, health service delivery, and the health system more widely. Often, getting to this shared understanding requires multiple discussions where the value of digital health solutions is shared, and those in attendance can ask questions, raise concerns, and gain a deeper understanding.

The importance of capabilities for the development, implementation, and monitoring of digital health governance activities is also highly relevant to HRM. JLN countries where there were adequate capabilities related to strategy (e.g., thought leadership and policy-making aspects), technical know-how (e.g., knowledge on different technical aspects related to digital health), and administration (e.g., management of activities and milestones) faced fewer barriers in making progress in successfully implementing activities. It was further noted that governance related to human resources must respond to the changing composition of the workforce (e.g., the shift away from traditional full-time jobs) and the increasing challenge of recruiting into the public sector. As the latter is a large challenge in the ICT sector across several countries, given salaries in the private sector, multiagency coordination is required to find paths that enable government institutions to offer competitive rates to prospective employees.



Human Resource and Institutional Governance Structures Facilitating Digital Health Mission—ABDM (Ayushman Bharat Digital Mission) Rollout in India

The implementation of Ayushman Bharat Digital Mission (ABDM), India's digital health mission, was broken down into four steps.

- ▶ **Step 1:** Develop the Digital Public Infrastructure (DPI). This included the development of registries and health information exchange and consent manager, and the publication of application programming interfaces (APIs) and the integration process via Sandbox. This DPI was based on the National Health Stack (described in section below on the Enabling Role of the National Health Stack in Driving Health Sector Digital Transformation in India).
- ▶ **Step 2:** Identify all the software being used by hospitals, labs, and public health. This included convincing these facilities to integrate with the DPIs and demo that it is correctly integrated.
- ▶ **Step 3:** Roll out the integrated software back in the hospital, lab, or public health. This included enrolling the health facility and all the staff into Health Facility Registry (HFR) and Health Professional Registry (HPR).
- ▶ **Step 4:** Train staff on any process changes with the integrated software. Most commonly this was capturing the Ayushman Bharat Health Account (ABHA) during patient registration, issuing ABHA health IDs to new patients, and collecting consent for access to medical records.

The management of this integration effort was broken down into the following groups:

- ▶ Public health facilities
- ▶ Large private corporations
- ▶ Software suppliers to small hospitals, clinics, and labs
- ▶ Consumer health apps

Laying the Groundwork for Adoption and Expansion

In the early phase of developing an implementation plan for the National Health Stack, a digital system public infrastructure for the health sector, the Ministry of Health and Family Welfare (MoHFW) constituted a committee and led the process. This committee was chaired by the former secretary at Ministry of Electronics and Information Technology (MeitY) and former chairman of Unique Identification Authority of India (UIDAI) and included members representing the MoHFW, National eGovernance Division (NeGD), National Institutions for Transforming India (NITI Aayog), MeitY, National Informatics Centre, Centre for Development of Advanced Computing, and state representatives from the governments of Madhya Pradesh and Andhra Pradesh (India, MoHFW 2019). This committee developed the National Digital Health Blueprint (NDHB) including essential building blocks and an action plan for digitalizing the health sector.

As implementation needed to be accepted and implemented by state/Union Territory (UT) governments, close coordination was needed. Coordination with states was achieved by undertaking the following:

- ▶ Asking states to set up a State Digital Health Mission (SDHM)
- ▶ Providing annual funding for the staffing and ops of the SDHM
- ▶ Providing guidelines for the activities to be done by the SDHM including identifying software systems that must be integrated, onboarding into registries, troubleshooting issues with ABHA, and monitoring performance in facilities where integrated software was rolled out.

Adoption and Expansion

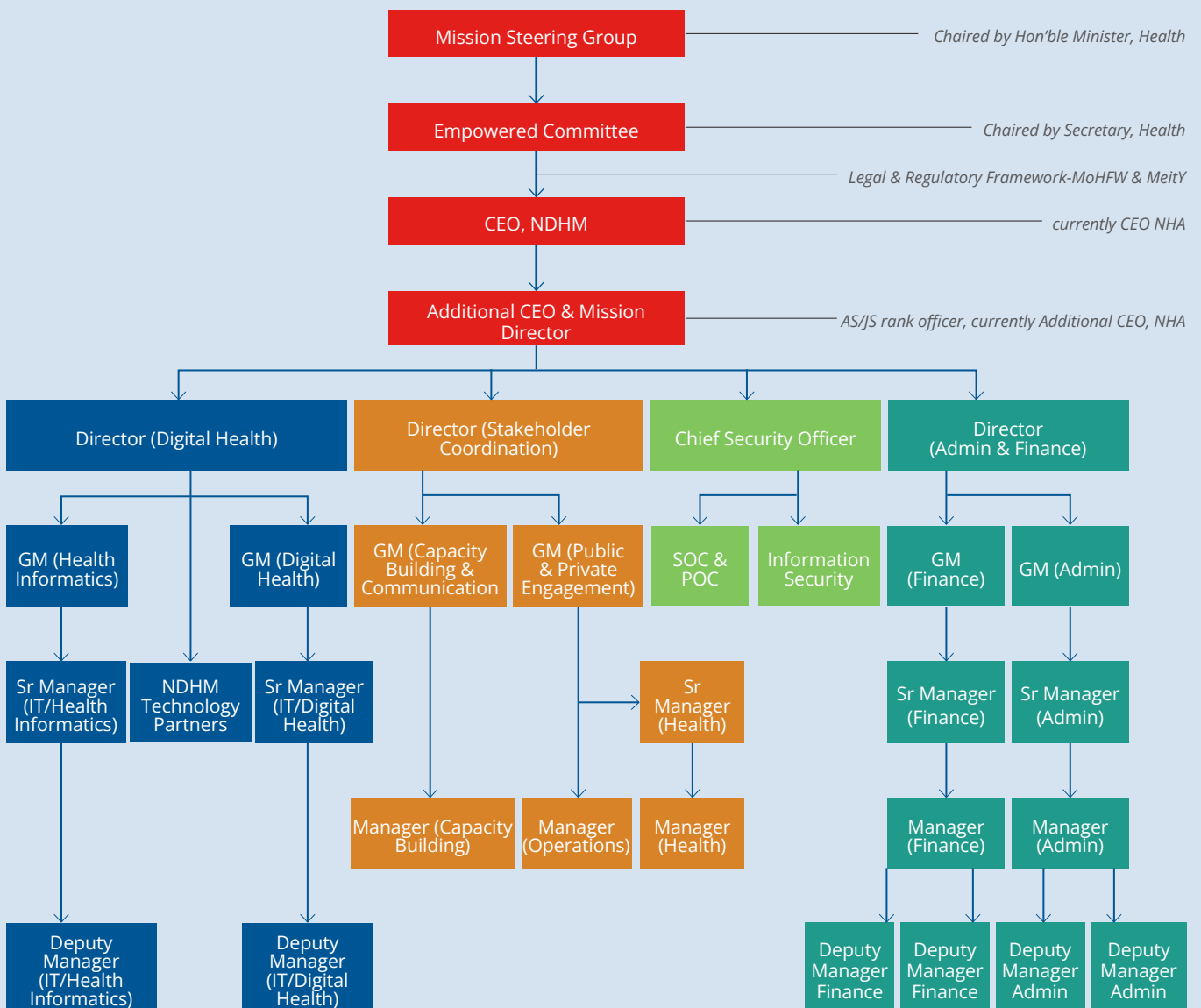
As the implementation went from the pilot to the adoption and expansion phase, there were additional stakeholders engaged along with the shifting of workforce types involved to support the process. Initially there was heavy reliance on external part-time advisers, small-scale IT development firms with short-term contracts fully focused on the technology development and installation. The selection of the workforce was based on the need to launch an ABDM pilot within a six-month timeline. Since the time frame did not allow for vendor selection via request for proposals (RFPs), the team decided to develop the first versions required for the pilot using existing

vendors prepaneled with the government. Post pilot launch, RFPs to select a Managed Services Partner with a five-year contract were carried out including a handover-takeover, a structured process of transferring duties, responsibilities, and assets, of the components developed during the pilot phase.

During the expansion phase of ABDM Digital Health Mission Rollout, the health care institutions that needed to be supported were a key factor that drove the human resource requirements. For example, during the pilot phase there was coverage of 8 to 10 public hospitals and no private hospitals, with only three vendors across these hospitals who required complete integration. Only three Personal Health Record (PHR) applications participated in this phase. During the expansion phase, there were over 2,000 vendors across public and private hospitals who came forward to integrate, and as such integration support, functional compliance, and security certification had to be scaled up.

The workforce within the NHA expanded to a broader group of full-time officers with focus on adoption strategy, expansion, and operations, including working with state governments and institutions in the private sector for onboarding of institutions and state governments (see figure 13). To support the implementation process NHA also contracted a large ICT company to support development and integration—a team focused on procurement functions.

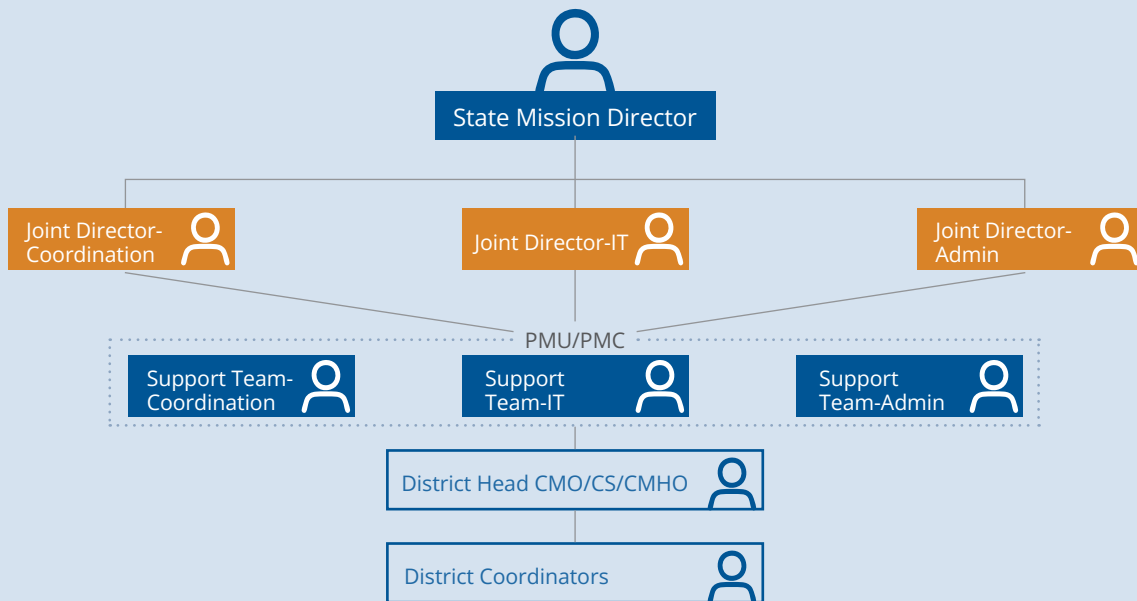
Figure 13: NHA Team Working on Adoption Nationwide



Source: National Digital Health Mission 2020.
 Notes: IT = Information technology; NHA= National Health Authority; NDHM= National Digital Health Mission; GM= General Manager; SOC= Security Operations Center; POC= Privacy Operations Center; IT= Information technology.

States and UTs were expected to establish a governance structure, populate ABDM registries, implement an ABDM-enabled health management information system (HMIS), and integrate state health programs with ABDM overall. NHA recommended an organization structure for mission teams headed by a state mission director leading a team of joint directors for coordination, IT, and administrative matters (see figure 14 below). The NHA took on five key areas of effort to drive state adoption including strategic guidance, financial support, training and capacity building, incentivization, and grievance redressal.

Figure 14: ABDM Organization Structure during Expansion Phase



Source: National Health Authority 2022b.

Notes: ABDM= Ayushman Bharat Digital Mission; IT= Information technology; CMO= Chief Medical Officer; CS= Chief Secretary; CMHO= Chief Medical and Health Officer.

Advancing Health Workforce Skills and Competencies on Digital Health

Advancing the skills and competencies of the health workforce for digitally enabled service delivery requires the coordination of a range of activities and actors. There are various high-level skills and competencies, for example, basic digital literacy and understanding of data privacy and information security, that enable relevant stakeholder groups to utilize digital health safely and to achieve maximum benefits (see table 8 below). As some competencies, for example digital literacy, are not health sector-specific, health sector leadership should be aware of its importance and should work both within the sector and across sectors to drive improvements.

The WHO is in the process of developing a Global Digital Health Competency Framework (GDHCF) to enhance digital health capabilities among key stakeholders, specifically for four primary audiences: policy makers and decision-makers; planners, developers, and researchers; practitioners and providers; and populations, patients, and communities (WHO 2025b).

Table 8: Skills Requirements for Digital Health

Stakeholder	Nonexhaustive list of required skills
Leadership (MoH and other government entities)	<ul style="list-style-type: none"> • Basic digital literacy (inc. computer literacy and use of dashboards) • Understanding of data privacy and information security • Basic data analysis skills
Leadership (health care organizations)	<ul style="list-style-type: none"> • Basic digital literacy (inc. computer literacy and use of dashboards) • Understanding of data privacy and information security • Basic data analysis skills
ICT staff	<ul style="list-style-type: none"> • Advanced understanding of data privacy and information security • Software engineering/development • ICT systems/database development/management
Health informatics staff	<ul style="list-style-type: none"> • Advanced understanding of data privacy and information security • Advanced knowledge of interoperability • Advanced data analytics
Clinical health care staff	<ul style="list-style-type: none"> • Basic digital literacy (inc. use of smart medical devices and clinical software) • Understanding of data privacy and information security • Basic data analysis skills • Ability to understand and forward information using a smart device
Administrators and nonclinical staff	<ul style="list-style-type: none"> • Basic digital literacy (inc. use of clinical software) • Understanding of data privacy and information security • Basic data analysis skills
Patients and the public	<ul style="list-style-type: none"> • Basic digital literacy (inc. use of mobile applications, using the internet) • Understanding of data privacy rights and information security • Ability to understand information presented using a smart device

Source: Adapted from European Health Parliament (2016).

Notes: MoH = Ministry of Health; ICT = Information communication technology.



Hiring, Upskilling, and Retaining the ICT Workforce and Its Potential for Increasing Efficiencies and Reducing Costs in Ghana

The Ghana Health Service (GHS) agency is the largest service agency of the Ghana MoH and is responsible for aligning its Digital Health Strategy with the National Digital Health Vision and implementing the strategy. Over the past decade, the GHS has focused on developing the IT workforce including engaging, hiring, and retaining more IT professionals. The GHS ICT Department has a Software Unit; Systems, Network, and Security Unit; and Operations Unit, which provide operational support for digital health initiatives. With a clear and intentional approach to building its workforce and capacity, the agency has trained ICT staff to develop and manage ICT systems. The staff comprises software, hardware, and network engineers who have, over the years, been the enablers of the technologies available. Moving forward, the GHS Policy and Strategy on Digital Health 2023–2027 clearly outlines the objective to promote collaboration and advance transfer of knowledge among ICT personnel (Ghana Health Service 2023).

This focus on developing the IT workforce, including hiring and upskilling more ICT professionals, is part of wider efforts to advance in-house capabilities that also encourage cost savings for the public sector institutions responsible for digital health in Ghana. For example, when developing the health information system (DHIS2), consultants were hired to train GHS ICT staff on how to develop the DHIS2 rather than develop the system directly, ensuring the system was ultimately developed with in-country expertise. By building this expertise among staff rather than outsourcing, the hope is to (1) increase efficiencies by reducing reliance on technology solutions managed externally, where there is limited ability to easily customize systems in a timely manner and adapt them to specific use cases; and (2) cut down costs by building systems in-house rather than using proprietary solutions, where there is the capacity to do so.

Other activities planned as part of training efforts outlined in the GHS Policy and Strategy on Digital Health 2023–2027 include the setup of peer learning communities among ICT staff for continuous capacity building and education and knowledge-sharing hubs to identify and share best practices, updates on new technologies, and lessons learned on the implementation of digital health interventions across regions and districts. Beyond knowledge sharing, technological development with other stakeholders in the ICT industry is planned through collaboration with ICT service providers and exchange programs with relevant institutions. However, the strategy acknowledges that the high attrition rate among highly skilled staff poses a threat to ICT.

Within GHS, retainment of staff is an important consideration, and recent initiatives have focused on training and capacity building. In 2024, 50 staff members were selected for six months of training in data security and cybersecurity, with aspirations to train others on software engineering and analytics within the next three years, so they are able to build and customize their own software and perform advanced data analytics. Staff involved in the training welcome the initiative as it helps them build their knowledge and skills, while GHS leadership hope that the focus on development will encourage staff retention.

Aligning Use of Digital Health to Human Resources Context

It is as important to consider where digital health solutions adequately address HRH challenges and whether they are the best approach for a given context. For example, if the benefits of using a given technology justify the increased time burden placed on those using it (e.g., if there is a simpler approach that could achieve the same outcomes without placing a higher burden on users). The level of human resources and effort required in the deployment of digital health solutions can be estimated based on both the scope of their use and relationship to existing workflows: How many workflows it affects, and whether it burdens or improves them (Marwaha et al. 2022). The importance of understanding these interactions cannot be understated in HRM for digital health.

Human Resource Coordination Bodies

There are several stakeholders that play a role in the coordination of HRM related to digital health. As noted in the Regulatory Instruments section, employment regulation may be updated to reflect the necessary skills and competencies related to the use of digital health solutions. The Ministry of Health, alongside other relevant stakeholders, is responsible for developing further regulatory instruments (e.g., guidelines, policies, rules, and procedures) to coordinate HRM pertaining to the use of digital health solutions in service delivery. Depending on the specific regulatory instruments being developed, stakeholders including the Ministry of Education and professional associations and organizations may be involved (e.g., for changes to scopes of practice among different cadres of health care workers, and subsequent updates to their professional education). A full list of potential stakeholder groups and institutions with a role in HRM are presented in table 9 below.

Table 9: Stakeholders and Institutions Relevant to HRM

Stakeholder group	(Potential) relevant institutions with a role in HRM
Government	<ul style="list-style-type: none"> • Health (e.g., national, regional, local government) • Executive leadership (e.g., president, prime minister, cabinet) • Legislative bodies (e.g., parliament) • Education (e.g., national, regional, local government) • Labor (e.g., national, regional, local government) • Civil service agencies and commissions • Statutory professional councils
Employers	<ul style="list-style-type: none"> • Private sector • Public-private partnership • Voluntary or nongovernmental organizations (NGOs)
Health care worker representatives	<ul style="list-style-type: none"> • Professional associations • Unions
International stakeholders	<ul style="list-style-type: none"> • Bilateral and multilateral agencies • Professional organizations
Civil society	<ul style="list-style-type: none"> • Community-based organizations • Patients rights' organizations
Other	<ul style="list-style-type: none"> • Media

Source: Adapted from European Health Parliament (2016).

Note: HRM = Human resource management.

Financial Resources

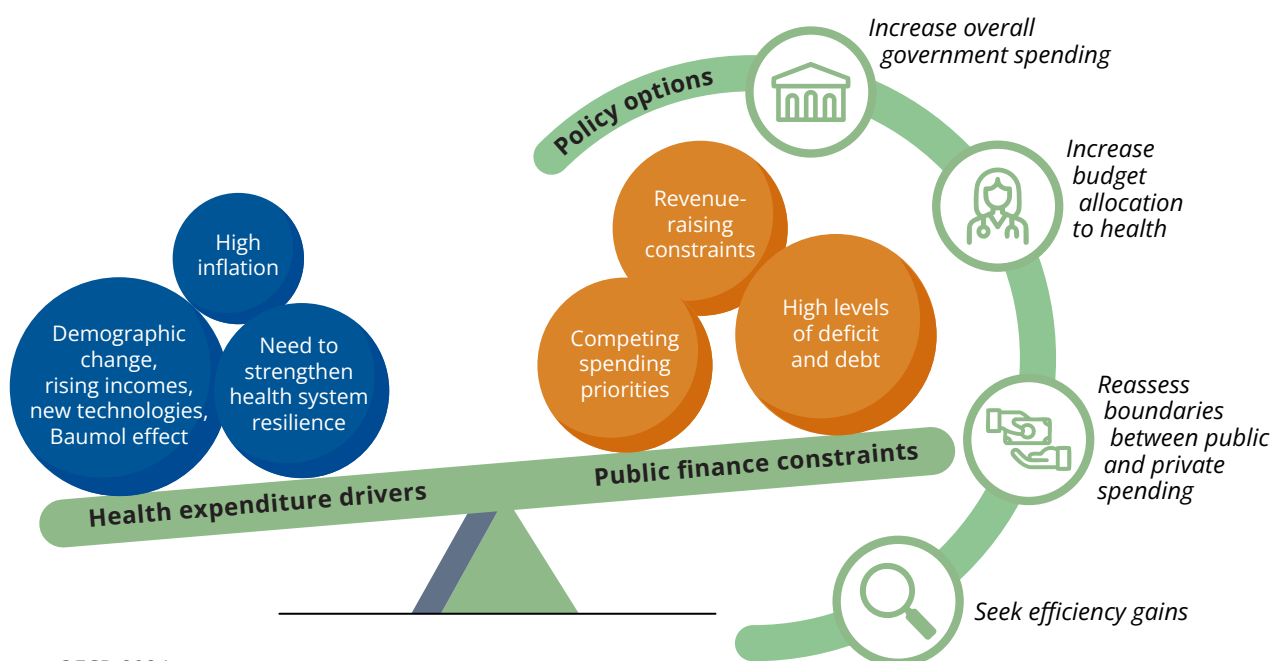
Public financial management (PFM) is typically described with a focus on the annual budget cycle, which is planned, executed, accounted for, and scrutinized. The objectives of such financial management include the following:

- ▶ Aggregate fiscal discipline, to ensure public spending, including revenue and expenditure, is consistent with targets and avoids generating unsustainable levels of public borrowing.
- ▶ Strategic resource allocation, to ensure that public resources are used in line with strategic priorities.
- ▶ Operational efficiency, to ensure maximum value for money is achieved in the delivery of public services.

The Public Expenditure and Financial Accountability (PEFA) partnership describes “good” PFM as “the linchpin that ties together available resources, delivery of services, and achievement of government policy objectives. If it is done well, PFM ensures that revenue is collected efficiently and used appropriately and sustainably” (Kristensen et al. 2019).

To understand the role of financial resources in digital health governance, it is first important to understand what is meant by fiscal space for health. Fiscal space is defined as “the availability of budgetary room that allows a government to provide resources for a given desired purpose without any prejudice to the sustainability of a government’s financial position” (Tandon and Cashin 2010). In the health sector, fiscal space describes budgetary room enabling the government to provide resources to the health sector. A lack of adequate and sustained levels of financial resources in many low- and middle-income countries (LMICs) is considered the biggest constraint to achieving health outcomes. An important challenge is raising sufficient funds for health within public finance constraints as health expenditure drivers continue to increase (see figure 15 below). Options for meeting the growing cost of health are of pressing concern, including finding common solutions to raise funds and free up resources by reducing wasteful spending (OECD 2024).

Figure 15: The Challenge of Raising Sufficient Funds for Health Within Public Finance Constraints



Source: OECD 2024.

Financial Management of Digital Health Activities

Financial management as part of the governance of digital health requires an understanding of both the fiscal space for health at the national and at the subnational level, as well as the financial resources required to develop and realize digital health strategies and road maps. To turn such strategies and road maps into a reality, this understanding must feed into the maintenance of fiscal discipline, strategic resource allocation, and value for money. The PEFA framework provides a PFM process across pillars and links process quality to budgetary outcomes that can provide a resource for developing financial management in the context of digital health, as illustrated in table 10 below. The pillars correspond to the phases of the budget cycle: (1) policy-based budgeting; (2) predictability and control in budget execution; (3) accounting, recording, and reporting; and (4) external scrutiny and audit. Beyond these, there is a cross-cutting pillar on comprehensiveness and transparency.

Underpinning the pillars is the importance of dialogue between finance and health authorities for fiscally sustainable solutions as part of funding more sustainable health systems (OECD 2024). Good budgeting practices and coordination, as outlined, can also address challenges related to duplication between health authorities and others. For example, in countries where some health responsibilities

are shared with non-MoH entities, or entities outside the MoH that are part of government and are thus receiving funding through Ministry of Finance, dialogue between authorities can limit the risk of inefficient and duplicative funding allocations.

Table 10: Financial Resources Considerations for Digital Health Mapped to PEFA Framework

Pillar	Description	Relevance to financial resource governance for digital health
1. Policy-based budgeting	Budget is prepared with due regard to government policy	Budget to implement digital health strategy and road map should align with the annual budget process and be developed to align with health sector, digital development, and any other relevant priorities/policies.
2. Predictability and control in budget execution	Budget implementation is orderly and predictable, and arrangements exist for the exercise of control and stewardship in the use of public funds	Budget implementation should involve close collaboration with budgetary institutions/budget authority to ensure recording and management of cash balances, debt, and guarantees; competition; value for money, and controls in procurement; and compliance on internal controls for nonsalary expenditure and any relevant audit procedures. Such actions are not specific to digital health governance but are important to consider in the wider context of health sector financial management.
3. Accounting, recording, and reporting	Adequate records and information are produced, maintained, and disseminated to meet decision-making control, management, and reporting purposes	To ensure adequate accounting, recording, and reporting, teams responsible for the management of finances related to the digital health strategy or road map should ensure they provide regular and timely accounts reconciliation, information on resources received by service delivery units, and good quality in-year budget reports and annual financial statements, delivered in a timely manner.
4. External scrutiny and audit	Arrangements are operating for the scrutiny of public finances and follow-up by the executive.	While not directly applicable to the financial management of delivering digital health strategies or road maps, it is considered good practice to provide requested information related to external audits covering any aspect of budget received or activities, should it be requested.
Cross-cutting: credibility of the budget	Budget is realistic and is implemented as intended.	Budget to implement digital health strategy and road map should take into account available (or expected) fiscal space within the health sector, with mechanisms to ensure accountability for the implementation of line items.
Cross-cutting: Comprehensiveness and transparency	Budget and fiscal risk oversight are comprehensive, and fiscal and budget information is accessible to the public.	Budget to implement digital health strategy and road map should be developed transparently with input from stakeholders across the health sector and should be accessible to the public.

Source: Authors (based on PEFA); Kristensen et al. 2019.

Note: PEFA = Public Expenditure and Financial Accountability.

Efficiency Gains Through Digital Health

Financial resources in the context of digital health governance also requires an understanding that considered investment in the right digital health strategies and solutions has the potential to address operational challenges, release capacity, and drive efficiency and productivity in the health sector (Ringrose and Wood 2024). However, it has been noted that a persistent challenge is how to mainstream the implementation of such solutions rather than continue to implement disconnected smaller-scale examples of best practice. Some basic actions that can facilitate digital solution optimization include undertaking a thorough review of existing digital health solutions in use prior to committing to radical transformation and procurement of new systems, identifying duplication, and looking at what additional use cases can be achieved with existing technology (Ringrose and Wood 2024). Siloes across health departments often result in a lack of awareness on digital health priorities and solutions implemented, for example in separate projects or programs, with teams making disjointed plans and further investments unaware that the technology is already purchased and in use. To address these challenges, coordination within the Ministry of Health and across government is critical.



Digital Health Incentive Scheme to Encourage Adoption of Technologies Among Health Facilities and Service Providers in India

The Ayushman Bharat Digital Mission (ABDM) (digital mission) in India is implemented by the National Health Authority (NHA). Recognizing the potential of digital health to drive system efficiencies, including longitudinal health record creation for patients across the continuum of care, the NHA launched the Digital Health Incentive Scheme (DHIS), a strategy and plan incentivizing the adoption and participation in the ABDM ecosystem, from January 1, 2023. The DHIS focuses on strengthening the use of digital technology across the four building blocks of the ABDM ecosystem, with registered facilities and service providers able to create digital health records through ABDM-enabled health management information systems (HMISs).⁷ In June 2024, the DHIS was extended by the government until June 30, 2025 (India, MoHFW 2024b).

The DHIS provides financial incentives to health facilities, including laboratories and radiology diagnostic centers, and entities providing ABDM-enabled digital solutions based on the number of transactions they offer above a predefined base level of digital health transactions (India MoHFW 2024a). Health facilities (small clinics and hospitals) and diagnostic facilities and labs are paid Rs 20 (0.23 USD) per transaction once they reach the eligibility threshold, up to a maximum of Rs 4 crore (Rs 40 million rupees/459,000 USD).⁸ Additionally, Digital Solution Companies (DSCs) can claim financial incentives under the DHIS for helping smaller clinics and hospitals achieve digital health adoption. For example, through the benefits provided to the DSCs, their costs can be reduced by enabling smaller clinics and hospitals to take up their solutions at a more affordable cost (ABDM 2022b).

The DHIS guidance note provides the following example to illustrate the benefits of participating in the scheme: “A 20 bedded hospital does 1300 transactions per month. The base level of transactions is 1000 (50 transactions per bed x 20 beds). It is eligible for an incentive of Rs 6,000 (69 USD) (Rs 20 each for 300 transactions above the base level of 1000). The DSC is eligible for an incentive of Rs 1500 (17.25 USD) (25% of the incentive received by the hospital)” (ABDM 2022b).

The total number of facilities, hospitals, diagnostics/labs, and DSCs registered with the scheme and the amount that has been paid out can be tracked in real time via the ABDM public dashboard.⁹ Table 11 below shows the values on March 7, 2025.

As of 2025, the total financial outlay for the scheme is Rs 120 crores (Rs 1.2 billion rupees/13,800,000 USD), subject to availability of funds.¹⁰ NHA notes in the guidance that the effectiveness of the scheme will be consistently monitored, and suitable changes about its continuation, modification, budget, or otherwise will be made as and when required.

To further encourage the adoption of HMIS for smaller providers that have a higher marginal cost of adopting solutions, and may be discouraged because of this, eSushrut Lite HMIS has been developed. Costing Rs 299 per month (3.45 USD), this more affordable, modular HMIS supports small health care facilities with digitization and ABDM compliance, with features including ABHA (unique health ID) generation, e-prescription, record sharing, and maintenance of appointments, while integrating with national health frameworks (India, MoHFW 2024e).

Table 11: Financial Management Considerations for Digital Health Mapped to PEFA Framework

	Total registered	Total amount paid
Facilities	17,055	Rs 505,260,500 (5,797,865 USD)
Hospitals	16,594	Rs 502,463,520 (5,765,770 USD)
Diagnostics/Labs	461	Rs 2,796,980 (33,000 USD)
Digital solution companies	66	Rs 150,392,485 (1,725,920 USD)
Total	Rs 1,160,913,485 (13,322,485 USD)	

Source: National Health Authority 2025b.

Notes: PEFA = Public Expenditure and Financial Accountability; Rs = Indian Rupee ; USD = United States Dollar.

Materials exist that can help governments consider various financial resources within the implementation of digital health activities. At present, there is no unified framework or method for classification, evaluation, and financing of digital health technologies, but several resources are available providing guidance (Mezei et al. 2023; Coder, McBride, and McClenahan 2024). The WHO Digital Implementation Investment Guide (DIIG), for example, aims to help governments and technical partners plan a digital health implementation to support national health system goals (WHO 2020). The DIIG provides support on planning, costing, and implementing digital health interventions, including selecting digital health interventions that are aligned with identified health needs, appropriate to a specific country context and integrated with existing technologies and the broader digital architecture. The document's chapters on developing a budget, including sections on phases of implementation, cost drivers, a budget matrix, and value proposition, including summary of outputs toward a costed investment plan, are most relevant to financial management. Other useful resources are listed in table 12 below.

Table 12: Materials on Financial Resources Related to Digital Health Governance

Resource name	Authors	Summary
Economic Evaluation in Digital Health (Wilkinson et al. 2023)	World Bank	Report outlines 5 steps of the digital health intervention economic evaluation framework: (1) determine the context, (2) determine the intervention type, (3) establish the level of complexity, (4) set the analytic principles, and (5) represent the value proposition.
Digital Health Blueprint Toolkit (World Bank 2024)	World Bank	A set of customizable resources designed to help country governments move from digital health strategy to implementation. Toolkit package includes investment rationale and 10-year digital health investment plan.
Digital Implementation Investment Guide (DIIG) (WHO 2020)	World Health Organization (WHO)	Guide to help governments and partners plan a digital health implementation that focuses on one or more health programs.

Source: Authors.

Coordination

Coordination enables collective expertise from across the public sector to be mobilized as relevant ministries, agencies, and departments are able to contribute their views and technical knowledge as part of decision-making processes (World Bank 2015; OECD 2025a; Santiso, Lafuente, and Alessandro 2013). With engaged and informed senior officials, once decisions are taken, ministries, agencies, and departments are able to effectively take action and implement an agreed-upon set of directives. The World Bank report, *Improving Public Sector Performance through Innovation and Inter-Agency Coordination* notes that while enhanced coordination will in part depend on the institutional model set up, it is also dependent on the broader institutional environment, including the following (Beschel Jr. et al. 2018):

- ▶ Government structure and level of fragmentation
- ▶ Whether a single party state or multiparty state exists
- ▶ Whether a coalition versus unified government is in power
- ▶ Whether there is a cabinet or a presidential system
- ▶ Political party composition at the national and subnational levels

There are multiple coordination mechanisms and approaches taking place within government, with decisions reached at the highest level having implications down the line. The report presents three such coordination mechanisms (see table 13 below) and orientates them across the types of coordination they do (e.g., policy or operational coordination).

Table 13: Government Coordination: A Conceptual Framework

	Whole of government (Primary focus is policy coordination)	Bilateral and multilateral interagency mechanisms (Primary focus is operational coordination)	Coordination mechanisms with subnational governments (Both policy and operational coordination)
Formal coordination mechanisms	<ul style="list-style-type: none"> • Cabinet • Subcabinet committees • Central agencies (president, PM, and cabinet office, chancelleries) • Delivery units • Expert Panels and Advisory Boards 	<ul style="list-style-type: none"> • Formal and informal interagency working groups, task forces, etc. • Dedicated liaisons and contact points • Established protocols for communications and information sharing (working level) 	<ul style="list-style-type: none"> • Fiscal policy, including taxes, grants, and transfer payments (conditional or nonconditional) • Regulatory practices and standard setting; league tables • Voluntary and involuntary mandates • Intergovernmental councils • National and regional associations
Practices that influence coordination	<ul style="list-style-type: none"> • The budget process • Government-wide M&E Systems • IT Systems • Generalist/Executive Service Cadres • Transparency 	<ul style="list-style-type: none"> • Reorganization, mergers • Staff secondments and rotations • Joint distribution lists, conferences and retreats • Combined training and staff development • Professional networks and associations • Media and social media networks 	<ul style="list-style-type: none"> • Legislative or parliamentary bargaining • Joint training and preparation exercises • Use of properties, facilities and equipment • Advisory services & counseling • Joint messaging

Source: Beschel Jr. et al. 2018.

Notes: PM = Prime minister; M&E = Monitoring and evaluation.

Coordination in Digital Health Governance

Examples of coordination throughout this report highlight how it has enabled different dimensions of governance for digital health to develop and work together to advance the use of digital technologies for health. For example, developing a clear vision and objectives for a national digital health policy requires substantial coordination between and across MoH and other government stakeholders, for example the Ministry of Education (for capacity building), the ministry responsible for infrastructure (for connectivity), etc. Coordination is also necessary with the private sector, the public, and other relevant stakeholders and in-country institutions. Such coordination in the design of a digital health policy lays the foundation for establishing legal and regulatory frameworks and an optimal institutional model, among other dimensions of governance. Coordination between the various actors is critical through the implementation of digital health governance activities over time (discussed in the next section). Regional coordination is also an important mechanism for bridging country-level knowledge gaps and gaining additional expertise.

Selecting the most appropriate coordination between bodies responsible for developing regulatory instruments for digital health requires a consideration of the formal coordination mechanisms typically used in-country (e.g., government committees, working groups, task forces, etc.), the focus of the coordination required (e.g., policy coordination or operational coordination), and the specific agencies and stakeholders that need to be involved (e.g., national/subnational and type of stakeholder). It is important to note that many countries face a tussle for control between different government entities in coordinating digital health governance (e.g., between the MoH and special digital entity or between two or more government agencies with ICT or digital remit), which can make coordination between bodies challenging to navigate. The AeHIN-led convergence workshops (Digital Health Convergence Workshops 2025) are one example of how to actively address this issue through cooperation exercises. Additional common challenges reported by JLN countries did not pertain to the ability to set up coordination mechanisms to govern and manage digital health activities; rather they concerned how to recruit and retain appropriately qualified stakeholders. For example, technical working groups and task forces may be set up for technical digital health activities, requiring multiple members with expertise who may be scarce in the country (see Governance of Human and Financial Resources section).



Developing a Robust Whole-of-Government Approach to Governance and Decision-Making in the Philippines

While the Philippines aligns most closely with the Broadband Commission’s Ministry of Health model (Kijisanayotin, Ratchatorn, and Suwanthaweesuk 2024), the approach taken focuses on “whole-of-system” governance principles. The governance and management of digital health is not limited to government agencies focused on health (e.g., Department of Health [DoH] and ICT [then through the Department of Science and Technology [DoST]], but includes other government agencies, and organizations and institutions outside of the health sector, including the private sector. Each of these stakeholders were brought onboard the eHealth Steering/Governance Committee.

COBIT 5 Governance Framework

The COBIT 5 governance framework, an ICT governance framework that recognizes the distinct purpose and responsibilities between the governance and management functions was recommended by an Interagency eHealth Technical Working Group (TWG) to the eHealth Steering Committee, which approved its adoption to delineate these functions in the development of digital health activities. Prior to the delineation, agencies noted a tendency for overlap between the governance and management functions leading to inefficiencies and delaying the implementation of policy, strategic, operational, and technical digital health interventions.

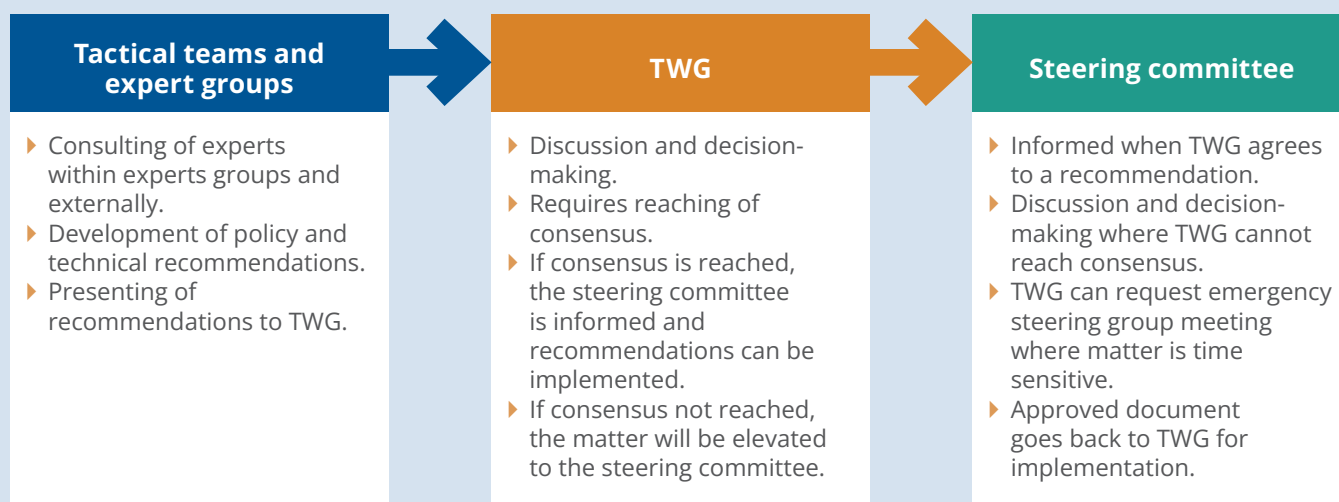
Under the COBIT 5 framework, the governance functions focus mainly on three aspects: evaluate, direct, and monitor (EDM). There is a focus on resource optimization and increasing the value proposition for the implementation of digital health and in the digital health governance structure. The governance function is being taken on by the eHealth Steering Committee, but the management functions are taken on by the TWG. Both functions work together to align, plan, and organize all activities. As the sitting members of the steering committee and TWG are mainly policy and decision-makers, additional combined expertise was needed, so different expert groups based on specific domains identified for eHealth were set up, for example, enterprise architecture, data management, data standards, data privacy, and ICT infrastructure groups. It was also determined that specific tactical teams that operationalize and conduct activities for each of the domains was another integral piece.

Optimizing the Structure Over Time

After undertaking an evaluation, the Programme Management Office (PMO), responsible for the day-to-day technical and administrative operations, found that the governance framework had become too difficult to manage, with 11–13 expert groups and two tactical teams set up, often with the same experts sitting in multiple groups, leading to siloed directions, policies, and implementation of activities. To tackle this challenge, the PMO worked to combine or dissolve certain expert groups. For example, the Enterprise Architecture, Health Data Standards, and the Data Management groups were combined. The Monitoring and Evaluation and Risk Management expert groups were dissolved as these critical functions should be embedded in every expert group rather than treated as separate functions.

The Philippines has seen progress in developing digital health, in part through the decision-making framework that governs roles and responsibilities, prioritization, and decisions between the steering committee, TWG, expert groups, and tactical teams (see figure 16). For example, the country was required to decide which unique person identifier to adopt between personal identifiers from the Department of Social Welfare and Development or the Philippine Health Insurance Corporation, or identifiers being issued by hospitals. The governance structure was in place enabling the TWG to consider the proposals, weigh up the pros and cons, and make a decision. The decision was then elevated to the steering committee as the issue was time sensitive. The emergency session of the steering committee was set up, and it was decided that the Philippines would adopt the Philippine Health Insurance identifier as the unique client or person identifier.

Figure 16: Overview of Decision-Making Framework for Digital Health Governance in the Philippines



Source: Authors.

Note: TWG = Technical working group.

Creating a Dedicated Programme Management Office to Support the “Whole-of-Government” Coordination Framework in the Philippines



As part of developing digital health in the Philippines, a dedicated Programme Management Office (PMO) was set up in 2014 following the DoH and DoST Joint Department Memorandum creating the National eHealth Governance Steering Committee and Technical Working Group in 2013. The PMO was charged with ensuring regular meetings of the steering committee and technical working groups, preparing appropriate documentation for the meetings, and tracking and monitoring the commitments and activities of the committee and TWG member agencies and institutions.

Specific program management staff for digital health in each government agency work closely with the PMO, sitting in the Philippine Department of Health to make sure that the assigned task or intervention for each member agency will be accomplished in a timely manner. This level of operational management is important as coordination between different member agencies is required.

The PMO does not make any decisions on technical/policy strategic matters. Its level of decision-making is at the tactical/operational level. It is the technical and administrative secretariat of all the expert groups. Power is at the level of influencing in this regard. For example, it presents what has been discussed at the different group meetings, making sure that the groups are engaging with each other, that discussions in expert groups are coming through to the TWG and steering committee level, including ensuring discussion points and challenges are well-articulated and understood by policy and decision-makers in the governance structure.



A Framework for National–Subnational Coordination in Kenya

In Kenya, the MoH is responsible for setting national health policy, including digital health policy, regulating health standards, and coordinating with County Health Departments to ensure equitable service delivery. County Health Departments oversee the implementation of health services at the local level, managing county hospitals, clinics, and community health programs.

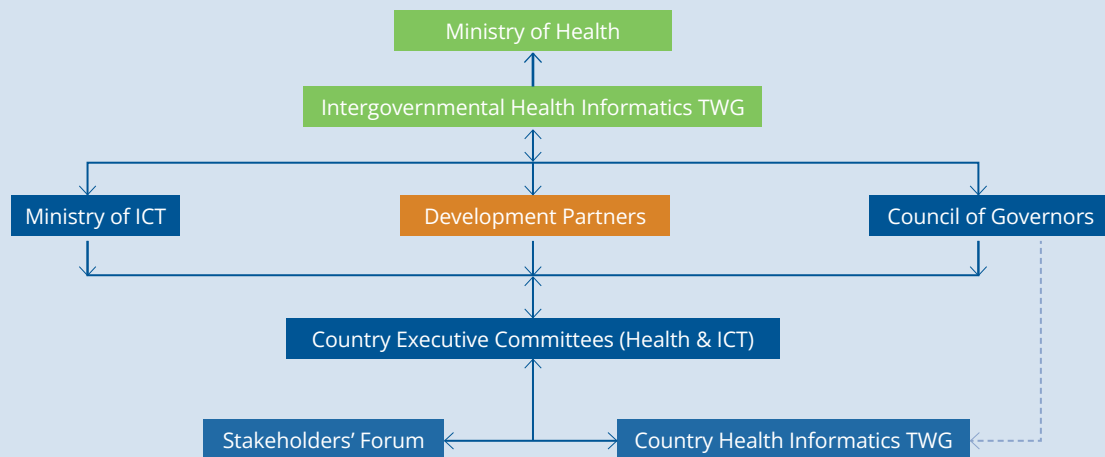
The Council of County Governors (CoG) is a nonpartisan organization that also plays an important role in the governance of digital health initiatives in Kenya. The CoG is made up of governors of the 47 counties in Kenya, who are charged with information sharing on the performance of county governments, collective consultation on matters of interest to county governments, providing a collective voice on policy issues, and sharing best practices (Devex 2025). The entity responsible for digital health within the MoH, through its Directorate of Digital Health, Informatics, Policy and Research (DHIPR), cannot initiate implementation or discussions with counties without going through the CoG. To do this, DHIPR seeks to build consensus with the CoG and agree on an implementation plan, and then CoG passes the information onto counties. For example, if DHIPR intends to conduct training on digitalization, it cannot go directly to the county, it must write a request to the CoG, and only proceed when it is approved.

During the period when the eHealth Policy 2016–2030 was being drafted, the MoH was tasked with the development, management, coordination, and integration of digital health initiatives. The coordinating body under the MoH was the Intergovernmental Health Informatics Technical Working Group (TWG), which comprised members from different areas such as the Ministry of ICT, health and IT experts, academia, civil society, and development partners (see figure 17 below). The TWG provided policy direction and implementation at national and county levels. To ensure engagement and buy-in at the county level, the CoG ensured that national and county bodies work cohesively to achieve eHealth goals, through its role in the setup of a County Executive Committee to serve as a liaison between the national and county governments. The remit of the County Health Informatics TWG was to oversee technical aspects related to county-level implementation such as monitoring, evaluation, and adherence to policies. Lastly the stakeholder forum facilitated communication between stakeholders to ensure activities ran smoothly.

As well as county-level participation in the drafting of regulatory instruments, provisions for coordination between national- and county-level stakeholders are also included within regulation on digital health. *The Kenya County eHealth Bill (2021)* provides a framework for interactions between eHealth (electronic health) service providers and patients (Kenya 2021). The bill mandates the cabinet secretary and the respective county executive committee members to “collaborate in the development and establishment of an integrated eHealth system at the national and county level of government” by formulating policies and standards for the implementation and regulation of the eHealth sector at the national and county levels and aligning the eHealth system with existing health care systems.

Similarly, national and county stakeholders play a central role in the institutional governance structure for digital health. The Digital Health Agency set up in 2023, following the passing of the Digital Health Act (2023), was established with the core mandate to develop, operationalize, and maintain a comprehensive Integrated Health Information System and Health Information Exchange (HIE) with several registers within the platform. The agency is governed by a Board of Directors consisting of a nominee of the CoG. Technical working groups at the national level coordinate with the agency, such as the Health Information System, Digital Health Working Group, Joint Coordinating Committee, and Intergovernmental M&E Working Group. Participation in the TWGs comes from national and county representatives, as the chair is the head of the DHIPR and the cochair comes from the counties.

Figure 17: Coordination Framework for eHealth Policy Implementation



Source: Kenya, MoH 2017.

Notes: TWG = Technical working group; ICT = Information communication technology.



A Framework for National–Subnational Coordination in Ghana

The Ghana Health Service (GHS) agency is the largest service agency of the MoH and is responsible for aligning the digital health strategy with the National Digital Health Vision. As in Kenya, the governance of digital health in Ghana involves substantial coordination with governance bodies and stakeholders at the subnational level. Regional Coordinating Councils (RCCs) from each of the 16 regions of Ghana are headed by regional ministers and are the highest administrative and political bodies charged under the laws of Ghana.¹¹

In 2023 a four-body governance structure was created by the GHS based on the need to coordinate digital health implementation in the service. The Regional Digital Health Technical Committee (RDHT) plays a critical role within this structure. All four work together by collecting feedback from the lowest level and pushing it up to the Office of the Director General, the highest-level body in the governance structure.

1. Office of the Director General (ODG)

An apex-level body responsible for policy-level decisions, with oversight of the complex regulatory landscape (ownership, compliance, and security) and resource mobilization for strategic investments.

2. National Digital Health Steering Committee (NDHSC)

Chaired by the director general, with the ICT Department as the Secretariat, the steering committee is responsible for policy direction by reviewing and approving all initiatives for digital health under the GHS, stakeholder engagement, and managing implementation of the strategy. The NDHSC meets twice per year to discuss feedback received from the Digital Health Technical Working Group (DHTWG) and Regional Digital Health Technical Committee (RDHT), which they share with the director of Policy Planning Monitoring and Evaluation Division (PPMED), who briefs the director general.

3. Digital Health Technical Working Group (DHTWG)

Chaired by the deputy director of the ICT Department for GHS, the working group is tasked with overseeing the implementation of the National Digital Health Strategy and providing monitoring, evaluation, and learning (MEL) support for digital health initiatives, overseeing day-to-day implementation of digital health activities, and developing costed annual action plans for digital health activities. The group meets every quarter, two weeks after the RDHT meeting, to put the regional findings together.

4. Regional Digital Health Technical Committee (RDHT)

The regional-level ICT Department is responsible for oversight and coordination of digital health strategies in their respective regions, and this committee is chaired by the regional director.

Regional stakeholders are also engaged in the development of regulatory instruments. For example, development of the Policy and Strategy on Digital Health 2023–2027 began with a situational analysis, and relevant stakeholders from across the country were interviewed, including individuals at the national, regional, and community levels. The development team, made up of technical representatives from the various directorates of the GHS, the regions, and external stakeholders from other agencies of the MoH, worked closely with academia to create the policy. To encourage regional buy-in, the document was launched in 16 regions to ensure local stakeholders were aware of the strategy and how to implement it. A dashboard was also developed to keep track of how it is being implemented at national and subnational levels.

Best Practice for Facilitating Coordination

Based on experience in improving coordination at the sectoral level as part of World Bank projects undertaken in the past 30 years, the World Bank has documented what has worked and what has not, which can guide planning related to coordination for digital health (see table 14 below). The approaches identified as facilitators of successful coordination include the following (Beschel Jr. et al. 2018):

- ▶ High-level political backing and the quality of leadership. The person at the helm of the reform should be technically skilled and politically savvy.
- ▶ Flexible and adaptive coordination mechanisms work better than rigid and prescriptive ones, as they have a better chance to be sustained and become self-reinforcing even as leaders change.
- ▶ Reforms that anticipate resistance and invest in buy-in are more likely to succeed.
- ▶ Routine reporting procedures, combined with careful assessment and monitoring of obstacles and measures to resolve them, are essential for accountability.
- ▶ Coordination of cross-sectoral priorities is more likely to succeed where there is an established link between cross-institutional objectives and the budgetary resources allocated to them.
- ▶ Center of government functions best when it focuses on strategic coordination and leaves the granular upstream and downstream coordination tasks to the ministries, departments, and agencies.

Table 14: Examples of Digital Health Coordination Approaches to Mitigate Negative Scenarios

What has not worked	JLN approach examples
Complex designs often lead to faltering reforms. Simple mechanisms often work best in low-income countries.	In Ghana the starting point was a basic coordination approach, which was then scaled up. This set the groundwork for a four-body governance coordination structure to be created by the GHS in 2023 based on the need to coordinate digital health implementation in the service.
Overlapping functions and blurred accountability make coordination difficult. This is often as important in sectoral coordination as it is in government-wide coordination.	COBIT 5 governance framework, an ICT governance framework that recognizes the distinct purpose and responsibilities between governance and management function, was selected in the Philippines to delineate these functions in the development of digital health activities.
Before introducing new institutional coordination mechanisms, it is important to take stock of what already exists. Building on the existing institutions tends to work better.	In Nigeria a state-level mapping of which entity is currently responsible for digital health is ongoing. The results will form the basis for discussions and a decision-making workshop with state- and national-level stakeholders that will explore suitable institutional models and coordination mechanisms.
Institutional solutions unethically transferred from one context to another lead to isomorphic mimicry and rarely produce the desired outcome.	This reflection is important to consider in the context of this report. While there are several approaches to the governance of digital health, and coordination is part of governance, there is no one-size-fits-all approach, and countries must consider the appropriate coordination mechanism for their own context.

Source: Authors (based on Beschel Jr .et al. 2018).

Notes: GHS = Ghana Health Service; ICT = Information communication technology.



The Enabling Role of the National Health Stack in Driving Health Sector Digital Transformation in India

India's National Health Policy (NHP) (2017) (India, MoHFW 2017) advocated for the deployment of digital solutions to have an integrated health information system. The NHP was soon followed by the National Health Stack Strategy and Approach (2018) (NITI Aayog 2018). This document presented the idea of a National Health Stack—a digital infrastructure built with a deep understanding of the incentive structures prevalent in the Indian health care ecosystem and focused on how to achieve interoperability among various health systems without replacing any existing health IT system. The stack identified five key components, including (1) National Health Electronic Registries, which serve as master health data; (2) a coverage and claims platform to support protection schemes; (3) a federated personal health records framework to enable easy access to health data by patients and researchers; (4) a national health analytics platform to inform decision-making; and (5) other horizontal components such as a digital health ID, health data dictionaries, supply chain management for drugs and payment gateways.

Initial Development of the National Health Stack

India had several digital health programs prior to the process of developing a strategy for the national health stack, and had established digital identity and digital banking programs, which provided experience and critical knowledge for such sector-wide transformation (World Bank 2023a). At the beginning of the process, India's Ministry of Health and Family Welfare (MoHFW) and other leading stakeholders focused on developing a strategy and implementation framework for the national health stack. The three-phased implementation approach constituted a pilot phase, an expansion phase, and a nationwide rollout phase.

During the pilot phase, the focus was getting the technology right. As such, technological platforms were piloted in select Union Territories (UTs). Key technologies piloted included (1) Health ID, (2) Personal Health Records (PHRs), (3) Health Professionals Registry (HPR, previously called DigiDoctor), and (4) Health Facility Registry (HFR). Health IDs assign a health account for patients with the option of linking with Aadhaar (national ID)—an individual identification number issued by the Unique Identification Authority of India. Personal Health Records included scanned health records and prescription reports. The Health Professionals Registry assigns a unique ID for all modern medicine doctors, nurses, and practitioners within the Indian System of Medicine once they have been verified by their respective councils. Finally, the Health Facility Registry assigned unique IDs to hospitals and labs, both government as well as private. All individuals in the UTs received Health IDs at no financial expense to individuals, all doctors enrolled in the Health Professionals Registry, all hospitals and labs enrolled in the Health Facility Registry, and providers were allowed access to health records based on informed consent and were able to add new health data to a patient's health records.

A stakeholder engagement consultation was planned with UTs to enable readiness, communicate expectations, and raise awareness. The NHA created the Health ID with UTs, organizing registration drives for sharing required information and issuance of the IDs. ABDM also issued guidelines for all doctors to UT governments on how to register on the DigiDoctor platform (now HPR), while the Indian National Medical Commission undertook verification of doctors who had registered. While the HFR was put in a public domain, ABDM and UT governments issued guidelines for all hospitals and labs on how to register. ABDM also set up the first-level verification team for all applications received. Once verified, guidelines were issued for all hospitals and labs to integrate with ABDM APIs or evaluate usage.

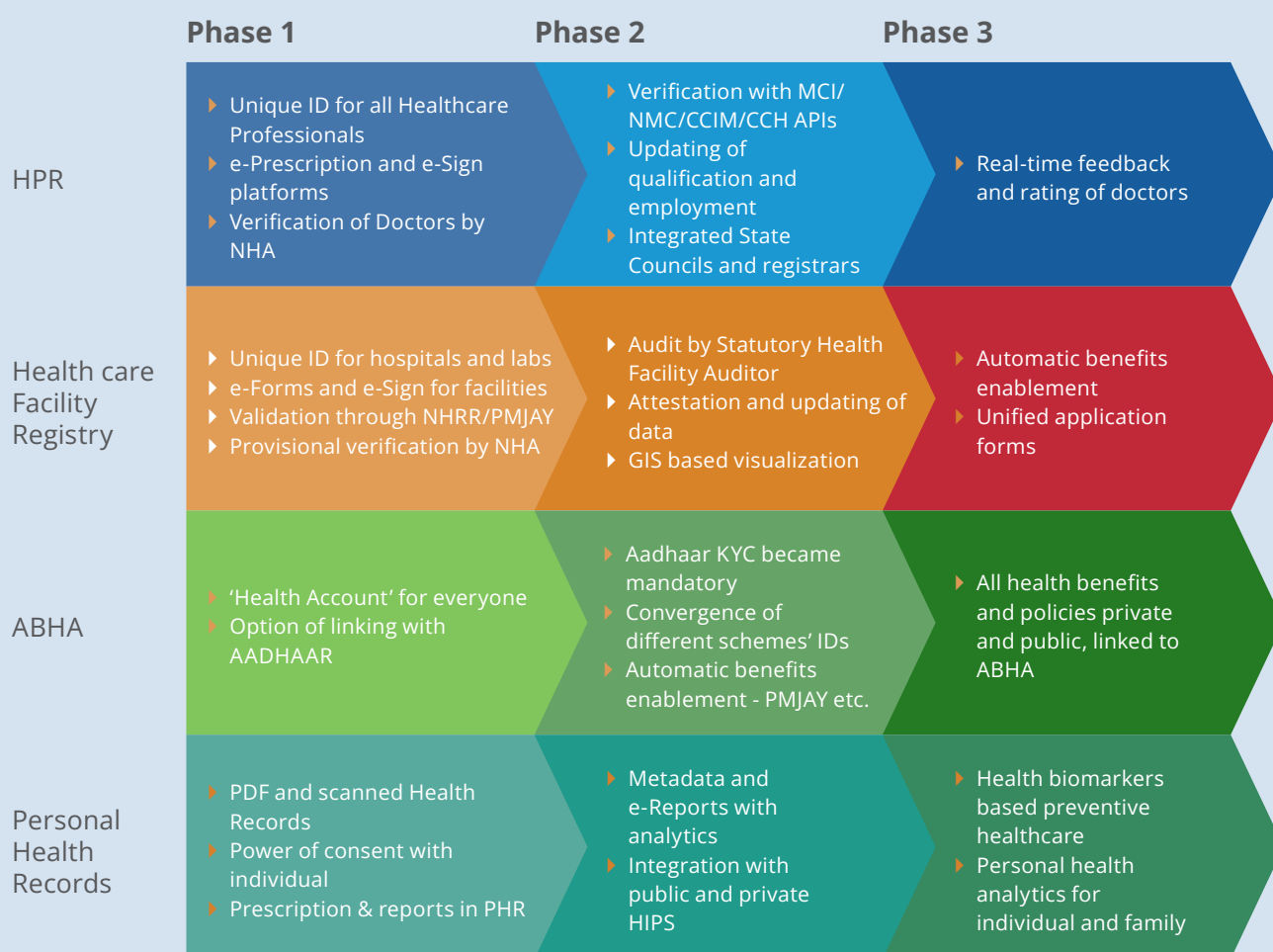
During the national rollout phase, the focus shifted from testing the technology to engaging with states and providing appropriate budget for state offices to implement. In addition, each of the four building blocks (Health ID, PHR, HPR, and HFR) implemented in the pilot phase had added functions such as linking of family members in the ABHA app, preparation of reports and analytics for PHRs, integration of data with state councils and registrars for DigiDoctor and updating of data and audit mechanisms for the HFR. Additional functionalities for each are included in figure 18. The process in this phase included onboarding and consultations with states, preparation of state-specific approaches as needed, state decision-making on state-specific implementation approaches, and allowing states to take the lead on state-level implementation with the NHA facilitating the process.

The adoption and expansion phase expanded the rollout of all components of ABDM throughout the country. This included added functions of linking ABHA to all public health programs, and personal health analytics for individuals using the PHRs. The Publications section of the ABDM website is used to provide public-facing policies and guidelines (National Health Authority 2025a).

Transitions from the pilot to the adoption and expansion phases relayed different challenges. During the pre-implementation and pilot phases, there were limited challenges because of the leadership of the MoHFW and the engagement of various stakeholders from the beginning of the process.

The nationwide rollout and expansion phases, which included engagement with private sectors and states at varying levels of digitization, introduced new challenges for implementers at NHA. Some challenges related to data and the ways of working cited by NHA implementers include the fragmentation of data and lack of interoperability. After continuous engagement and feedback it became clear that it was necessary to create value and align incentives to stakeholders for promoting wider adoption of ABDM. Following which, the NHA launched the Digital Health Incentive Scheme (DHIS) (See above section on Digital Health Incentive Scheme to Encourage Adoption of Technologies among Health Facilities and Service Providers in India), a strategy and plan incentivizing the adoption and participation in the ABDM ecosystem, to provide financial incentives.

Figure 18: Three-Phased Implementation of ABDM



Source: National Digital Health Mission 2020.

Notes: ABDM = Ayushman Bharat Digital Mission; HPR = Health Professional Registry; ABHA = Ayushman Bharat Health Account; NHA = National Health Authority; MCI = Medical Council of India; NMC = National Medical Register; CCIM = Central Council of Indian Medicine; CCH = Common Controls Hub; APIs = Application Programming Interface; NHRR = National Health Resource Repository; PMJAY = Pradhan Mantri Jan Arogya Yojana; GIS = Geospatial information system; Aadhaar = National ID (individual identification number issued by the Unique Identification Authority of India); KYC = Know Your Customer; PHR = Personal Health Record; HIPS = Health Information Portals.



**PUTTING DIGITAL
HEALTH
GOVERNANCE INTO
PRACTICE**

To develop digital health governance across the four dimensions described, activities must be undertaken according to the digital health governance initiatives planned (see definitions of these terms in table 15 below). For example, the development of a national digital health strategy (under the Regulatory Instruments dimension) is an initiative. To achieve the initiative, specific activities must be undertaken.

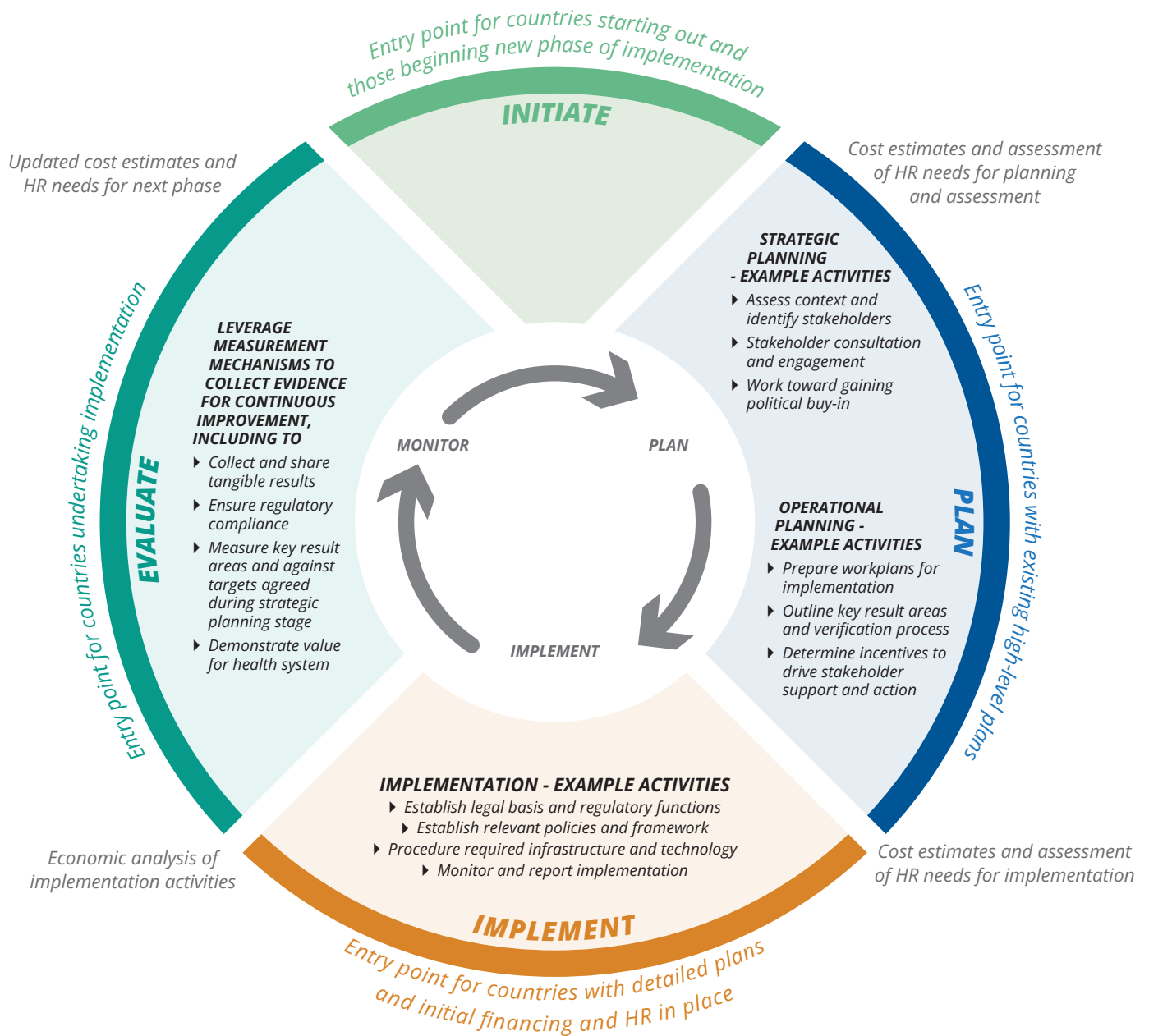
Figure 19 below outlines the cyclical nature of digital health governance activities that are required to achieve each initiative, starting with the initiation phase, which is an entry point for countries starting out in developing a specific digital health governance initiative, and countries beginning a new phase of implementation. The planning phase is the focal point for countries that have already undertaken planning activities, or have existing high-level plans. The implementation phase is defined by implementation activities and is a focal point for countries with detailed plans and initial financing and human resources in place to undertake the activities. Finally, the evaluation phase leverages measurement mechanisms to collect evidence for continuous improvement once implementation is underway. The findings that come out of the evaluation phase should be used, alongside updated information on costing and human resource needs, for the next phase of implementation, bringing countries back to the initiation phase of the cycle.

Table 15: Description of the Relationship Between Digital Health Governance Dimensions, Initiatives, and Activities

Digital health governance dimensions	This report discusses four governance dimensions: regulatory instruments, institutional models, human and financial resources, and coordination.
Digital health governance initiatives	Initiatives describe potential components within each digital health governance dimension that will be undertaken based on country priorities as related to digital health. For example, development of a digital health strategy, setup of institutional model, etc. These sit under each governance dimension.
Digital health governance activities	Activities describe actions required to achieve a specific digital health governance initiative. Activities are broken down into strategic/operational planning activities, implementation activities, and measurement activities. These sit under each governance initiatives.

Source: Authors.

Figure 19 : Phases of Digital Health Initiative Implementation and Entry Points



Source: Authors.

Note: HR = Human resources.

Key Activities to Develop Digital Health Governance

There are three primary activity groupings that enable countries to develop their digital health governance: strategic and operational planning, implementation, and measurement. Before moving to each, it is critical for assessments to be made on cost and human resource requirements for achieving the immediate planned next steps. Cost and human resource estimates must again be developed during the planning phase to inform how the implementation phase will be undertaken. Such plans can also be used to gain financial and human resource support from domestic resources or from donors. These estimates can be developed alongside project planning documentation (e.g., RACI chart, Gantt chart, or project timeline) to provide further clarity among stakeholders on the details of how the activities will be undertaken and in what time frame. The following subactivities outlined across the three primary activity groupings are not exhaustive and are intended to provide high-level examples rather than detailed information.

Strategic and Operational Planning

Strategic planning activities must be undertaken prior to operational planning activities; however, JLN countries noted the need for flexibility in undertaking activities under this grouping in parallel, based on the specific needs of the context and its stakeholders. Select examples of relevant strategic and operational planning activities are presented below.

Strategic Planning

Assess the Context and Identify Key Stakeholders

Conducting a comprehensive assessment to evaluate the current state of digital health infrastructure, identify existing gaps, and understand the specific needs of the health care system provides clarity that will serve as a basis for strategic and operational planning. This foundational step is crucial for establishing a clear understanding of the starting point and the areas that require attention (World Bank 2023c). Following the assessment, it can be helpful to define the objectives and scope of the digital health governance initiative. By setting clear objectives and a well-defined scope, the government can create a focused and strategic approach to digital health governance, ensuring that all efforts are aligned with the overarching goals of the health care system. At the very initial stage, it is also helpful to identify all stakeholders across various agencies involved in policy making, decision-making, implementation, and usage of digital health solutions so they can be engaged at the appropriate stages.

Stakeholder Consultation and Engagement

Engaging all relevant stakeholders, including health care providers, technology companies, patients, and civil society, is essential for the successful implementation of digital health initiatives. Effective communication with all stakeholders is crucial for building trust and ensuring transparency. By maintaining open and transparent communication, the government can foster collaboration and support for the digital health initiative, leading to its successful implementation and sustainability. Stakeholder coordination and engagement should happen at multiple levels depending on the goal, including locally, regionally, nationally, and internationally.

Example: Regional Networks Supporting Advancements in Digital Health Governance

The Asia eHealth Information Network (AeHIN) is a regional digital health collaborative with members from South and Southeast Asia. As previously discussed, AeHIN Convergence Workshops bring relevant stakeholders together to collaborate and build multisectoral coherence in developing a national vision for national digital-in-health programs (Digital Health Convergence Workshops 2025). AeHIN Working Council members are also involved in advocacy activities to highlight the importance of improvements related to digital health governance in the Asia region (AeHIN 2025). A Call to Action based on participation from 14 countries in a two-day “write-shop” was released in 2023. The Call to Action aims to encourage countries in the region to “take impact-oriented steps that could improve the design and implementation of digital health strategies.” Specific steps outlined include establishing a governance mechanism that ensures equitable access to digital health through multistakeholder coordination and collaboration and developing a digital health blueprint that aligns with national health strategies, policies, priorities, and needs.

Work Toward Gaining Political Buy-In

The level of political buy-in will vary from context to context, but it is almost certain that some level of political support building will be required as initiatives related to digital health governance are being set up. Political buy-in is a prerequisite for digital health governance as politicians and high-level decision-makers must understand and support the initiative and will likely drive aspects of its setup.

When working toward gaining political buy-in where none already exists, it is crucial for MoH to begin this process as quickly as possible prior to beginning any other activities. In this scenario, it is important to develop an easily articulated and understood case for digital health (if this is not already established in the country) and for its governance, aligning with health system reform where possible. This case should simplify the topic in layman’s terms for the range of stakeholders who may need to be engaged, and should be backed by evidence of effectiveness, and potential benefits to the health system and country.

When developing buy-in where some support already exists, it is important to continue to articulate the case for digital health governance and the specific initiative, while also encouraging the input of decision-makers to participate in ongoing strategic and operational planning activities. The time required to gain political buy-in described by representatives from JLN countries can vary dramatically from context to context, from several months to several years.

Operational Planning

Prepare Work Plans for Implementation

Effective project management is the cornerstone of successful implementation, and the preparation of work plans can enable stakeholders to understand their roles and responsibilities, important milestones, dependencies, and timelines. Work plans will allow those involved in implementation to stay on track, or reassess the approach when unexpected scenarios arise, to help drive progress. Teams can easily find useful project management tools and templates online, such as RACI matrices and Gantt charts, to begin the process of preparing work plans.

Outline Key Results Areas and Verification Process

Through the measurement mechanisms set up, key results areas can be monitored and reported

on. Key results areas that align with relevant strategies, objectives, and goals set out in the work plan should be agreed by the main stakeholders involved in the project. Setting up a verification process to ensure data collected accurately reflect progress toward the results areas identified is important for ensuring transparency and accuracy in reporting.

Determine Incentives to Drive Stakeholder Support and Action

Stakeholder support and action are critical to the successful development of digital health governance initiatives. While legal and regulatory functions can act as a stick to drive action, putting in place incentives can act as a carrot to encourage greater support. For example, to enable the functioning of TWGs and other coordination bodies in Ghana, individual members are encouraged to join and participate through professional development opportunities. To enable the realization of ABDM in India, the DHIS scheme has encouraged providers to adopt digital systems.

Implementation

Establish Legal Basis and Regulatory Functions

The development of legislation and regulation or amendments to existing provisions may be required for the initiative to be achieved. For example, should an independent digital health agency need to be established, there may be legal challenges that block or delay its set up (See The Development of a Digital Health Agency in Kenya). It may take time to establish the legal basis and regulatory functions required, so the requirements should be mapped out in previous strategic and operational planning. Additionally, political buy-in will be critical to gaining traction, which again highlights the importance of the activities outlined in the planning stage.

Establish Relevant Policies and Frameworks

Like establishing required legal and regulatory mechanisms, the development of policies is key in implementing many digital health governance initiatives. The policies established should align with national and international standards to ensure consistency and reliability. By establishing a robust policy framework, the government can provide clear guidance and direction for all stakeholders involved in the digital health ecosystem, promoting a cohesive and coordinated approach to digital health governance.

Example: Establish a Strategic Plan for Digital Health

Developing a strategic plan for digital health is an example of a relevant policy/framework. When establishing a strategic plan, a work plan should be developed, with key results areas defined, and key stakeholders engaged and onboard prior to implementation of the activity. The strategic plan should be comprehensive, detailing both short-term and long-term goals, timelines, and milestones.

Similarly, depending on the institutional model being planned to support digital health governance in the country, the development of a specific policy/framework (e.g., a digital health governance framework) or inclusion within a more general policy/framework may be required to facilitate its setup. Early planning to agree and establish the planned institutional model can more easily facilitate its implementation later.

Develop and Procure Required Infrastructure and Technology

Where the digital health initiative being implemented requires infrastructure and technology (e.g., hardware, software, and connectivity solutions), information on the requirements, and how they will be developed or procured, as well as approximate costs, should be outlined in the operational planning stage. During the implementation phase these plans will be further developed and likely recosted to ensure there is sufficient budget in place (possibly through donor financing).

Ensuring interoperability between different digital health systems and applications is also essential for seamless data exchange and integration. As such, the provision of cost estimates and tight financial management is required throughout the implementation phase and should be reflected upon during the measurement phase.

Monitor and Report Implementation

Monitoring and reporting should be undertaken and captured throughout the implementation phase. These documented findings can subsequently inform, and be used as part of, the evaluation of results that come after the implementation.

Measurement

Following the initiation of implementation activities, those involved in the work should leverage measurement mechanisms to utilize existing reporting on the implementation and collect additional evidence for evaluation and continuous improvement, including the following:

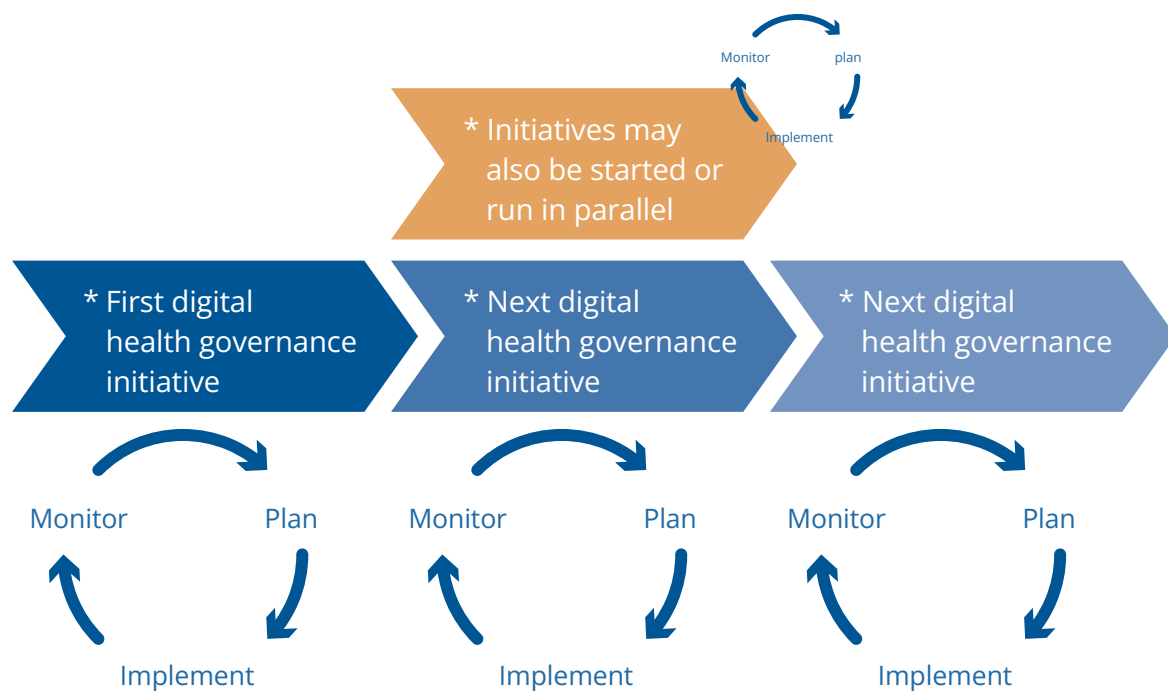
- ▶ Collect and share tangible results
- ▶ Ensure regulatory compliance
- ▶ Measure key results areas and against targets agreed during the strategic planning stage
- ▶ Demonstrate value for the health system

Starting with pilot projects can be a helpful approach to test and refine digital health solutions. These pilot projects can provide valuable insights that can be used to make necessary adjustments before scaling up, but if poorly designed a pilot project may end up failing to scale and providing low value for money. Appropriate reporting can help fill the gap in this regard (Perrin Franck et al. 2023). Implementing robust monitoring and evaluation mechanisms is essential to track the progress and impact of digital health initiatives. These data can inform decision-making and continuous improvement, ensuring that digital health initiatives are effective and achieve their intended outcomes.

How Key Dimensions of Digital Health Governance can Change Over Time

There are several ways to think about how key dimensions of digital health governance can change over time (see figure 20 below). At one level, priority digital health governance initiatives will vary over time. For example, the development of a national digital health strategy may be a priority in the early years of formalizing digital health governance in the country, but once this is set out, the priority initiative may change to focusing on setting up an institutional model or coordination mechanisms to facilitate the implementation of the strategy. At a more granular level, the activities required to realize each digital health governance initiative evolve through various stages—from strategic and operational planning, to implementation, to measurement—a cycle that is then repeated for each new activity or phase of the initiative. Taking a real-world approach to progressing initiatives and activities requires acknowledgment that they may be derailed or stopped and will therefore not always go through the standard cycle. Nonetheless, derailed or failed initiatives may also serve to set the scene or inform future initiatives that will be undertaken to completion.

Figure 20: Digital Health Governance Initiatives and Activities Over Time



Source: Authors.

Practically, digital health governance initiatives are often implemented alongside, and linked, with digital initiatives from other sectors. In Cambodia, the MoH has established a Digital Health Department, developed a HMIS master plan, drafted a digital health strategy, and introduced an electronic medical record (EMR) for noncommunicable diseases (NCDs). As part of the implementation of the Universal Health Coverage (UHC) road map, related regulatory instruments were developed outside of the health sector but have relevance for achieving health sector goals. For example, the

Digital Transformation Strategy for Social Protection included plans for the development of a registry portal managed by the General Secretariat of the National Social Protection Council (GS NSPC) and a patient management and registration system (PMRS) developed and managed by the Health Equity Fund (HEF). The PMRS function was expanded to include a digital payment certification system for the social protection system in Cambodia. The digital payment certification system is under development and managed by the National Payment Certification Agency (NPCA).

This section presents lessons learned from JLN countries on the specific activities undertaken to realize digital health governance initiatives across the different dimensions previously discussed.

Regulatory Instruments

In the initial phases before implementation, countries begin by recognizing the necessity of digital health and declaring it a national priority. This is often supported by high-level political commitment and the development of comprehensive regulatory instruments to facilitate digital health activities. Initial regulatory instruments may be fragmented and reactive, addressing immediate needs without joined-up, long-term planning. Taking national strategy as an example, table 16 below delineates specific activities outlined by JLN members at different stages of digital health governance activities discussed in the previous section: strategic and operational planning, implementation, and measurement. While not exhaustive, the table provides a high-level understanding of how JLN countries developed their national digital health strategies over time.

Table 16: JLN Country Examples of Initiatives Related to Regulatory Instruments Over Time

Strategic & operational planning	Implementation	Measurement
<p>In Ghana, Policy and Strategy on Digital Health 2023–2027, the strategic and operational planning activities included the following:</p> <ul style="list-style-type: none"> • A situational analysis, in which questions were framed around the WHO eHealth building blocks (WHO 2012). • Relevant stakeholders from across the country were interviewed, including individuals at the national, regional, and community levels. • Based on findings from the situational analysis and a desk review, the 10 strategic objectives outlined in the Digital Health Strategy were developed alongside plans for monitoring and evaluation to make sure the document was operational. • The strategy was validated at two stakeholder meetings, including at a senior managers’ meeting where all senior directors were in attendance. • To encourage regional buy-in, the document was launched in 16 regions to ensure local stakeholders were aware of the strategy and how to implement it. 	<p>In Indonesia, the implementation plan and timeline were clearly set out in the Blueprint of Digital Health Transformation Strategy 2024. This comprised 3 main groups of activities that were broken down into subactivities to take place between 2021 and 2024:</p> <ul style="list-style-type: none"> • Health Data Integration and Development to improve the quality of health policies based on accurate, up-to-date, and complete data. • Integration and Development of Health Service Applications to increase the efficiency of health services. • Health Technology Ecosystem Development to create an ecosystem of digital health innovations, spurring collaboration between governments, universities, industry, and the public. 	<p>In Ghana, a dashboard was developed to keep track of how the Policy and Strategy on Digital Health 2023–2027 is being implemented.</p>

Source: Authors.

Institutional Leadership and Structure

Over time, institutional leadership in digital health governance evolves from ad hoc implementation of initiatives within single ministries to more joined-up, planned approaches to facilitate strategic digital health initiatives and multistakeholder involvement that work toward developing digital health governance in one or more dimensions. The involvement of stakeholders also expands to include various government departments, private sector entities, and academic institutions, reflecting the increasing complexity and scope of digital health initiatives.

Substantial efforts must be taken to maintain the institutional structure and its functioning over time. As noted in the Institutional Leadership section, there are several challenges associated with each of the institutional models presented by the Broadband Commission that must be considered and managed on an ongoing basis. Financial sustainability is a challenge to maintaining each type of institutional model, requiring particular attention to several of the previous steps including political buy-in and establishing a legal basis and regulatory functions. Cost estimates and economic evaluations are also essential to managing the costs of maintaining the institutional model and showing its value for money.

Considering the setup of an institutional model, table 17 below charts specific activities outlined by JLN members at different stages of the process. Establishing specialized committees and working groups is also observed over time to ensure the functioning of coordination mechanisms, policy direction, and implementation of digital health strategies. These changes highlight the growing recognition of the importance of collaborative governance and the need for specialized structures to effectively manage the complexities of digital health initiatives.

Table 17: JLN Country Examples of Initiatives related to Institutional Models Over Time

Strategic & operational planning	Implementation	Measurement
<p>In Nigeria, the process of setting up an institutional model for digital health has just begun. As Nigeria is a federation, the institutional model must function both federally and at the state level. As such, strategic and operational planning activities are focusing on the following:</p> <ul style="list-style-type: none"> • Undertaking a state-level mapping of who is currently responsible for digital health. • Holding virtual consultations first with commissioners, who are decision-makers at the state level, and then with those nominated by the commissioners in each state. • Organization of a decision-making workshop with all relevant stakeholders to discuss potential institutional models and coordination mechanisms, share terms of reference (TORs), and agree on next steps. • The workshop will also seek to discuss early ideas on the technical aspects of the agenda, including the health information-exchange architecture by sharing initial thinking from the federal government on what this could look like in practice. 	<p>In Kenya, the Digital Health Act (2023) was passed, establishing a Digital Health Agency (DHA) with the core mandate for creating information registries, managing data exchange, ensuring health application systems and infrastructure that are fit for purpose, developing interoperability standards, certifying digital health solutions, mobilizing resources for sustainability, and providing an advisory role to the cabinet secretary for health on matters related to digital health. However, it is important to note that the potential nullification of the Digital Health Act also jeopardizes the legal foundation for the establishment of the Digital Health Agency.</p> <p>Additional implementation activities include the following:</p> <ul style="list-style-type: none"> • Setting up the DHA Board and the acting CEO • Drafting of standard operating procedures (SOPs) • Initiating early projects within the remit of the DHA 	<p>The role of measurement in the institutional leadership and structure looks at the strengths and weaknesses of planned or current arrangements to seek to strengthen the institutional approach selected. While there was no specific example of such measurement activities, an OECD assessment of the institutional and governance framework for digital government in Chile provides a relevant example of potential areas of assessment and the role of strengths, weaknesses, opportunities, threats (SWOT) analyses based on analyses of select OECD countries (OECD 2016a).</p>

Source: Authors.

Notes: JLN = Joint Learning Network; OECD = Organisation for Economic Co-operation and Development; DHA = Digital Health Agency; CEO = Chief executive officer.

Governance of Human and Financial Resources

Digital health governance activities under the umbrella of human and financial resources will be varied and context specific. HRM activities may focus on training IT professionals and health care providers to use new technologies, but in the context of digital health governance, important activities include forward planning on what type of workforce requirements will be needed at different stages of strategy realization (table 18 below provides an example of actions undertaken in India as part of implementation of the National Health Stack), and the recruitment and retention of ICT professionals sitting within the institution responsible for overseeing digital health activities in-country (see previous example on developing the skills of Ghana Health Service staff). As the system matures, there will be greater emphasis on specialized training for digital health professionals, including roles such as data scientists, cybersecurity experts, and digital health strategists. Continuous professional development becomes crucial to keep up with technological advancements, and training programs should be designed to address the specific needs and challenges of the digital health ecosystem.

Similarly, developing and implementing a budget to turn national digital health strategies and road maps into a reality is an important activity that offers a useful example in the context of digital health governance. Early investments are often limited and come primarily from donors and/or government budgets. Over time, sustainable funding models come into play including public-private

Table 18: JLN Country Examples of Initiatives related to the Governance of Human and Financial Resources Over Time

Strategic & operational planning	Implementation	Measurement
<p>In India, HRM was an important consideration of realizing the implementation plan for the National Health Stack. Strategic and operational planning focused on the following:</p> <ul style="list-style-type: none"> • Setup of a [National Digital Health] Mission Steering Group, led by MoHFW, and broader coordination structure for governance and management. • Under this structure, the National Health Authority (NHA) led the implementation of ABDM and coordinated with all stakeholders during the implementation. Key responsibilities included ensuring the financial sustainability of ABDM, coordinating with MoHFW and other state bodies, and resource mobilization and allocation. • For the different phases of implementation of ABDM, it was agreed that the HR requirements would vary and would need to be pragmatic based on specific contextual considerations. E.g., Since the 6-month timeline for launching ABDM did not allow for vendor selection via RFPs, the NHA team decided to develop the first versions required for the pilot using existing vendors prepaneled with the government. • For the nationwide rollout phase, NHA recommended an organizational structure for mission teams headed by a state mission director who leads a team of joint directors for coordination, IT, and administrative matters. 	<p>In India:</p> <ul style="list-style-type: none"> • During the pilot phase of implementation, the workforce was largely made up of external part-time advisers and small-scale ICT development firms with short-term contracts focused on technology development and installation. • Post pilot launch, the NHA published RFPs to select a Managed Services Partner with a 5-year contract, which included a handover of the components developed during the pilot phase. • During transition to an national rollout phase the workforce included a large ICT company contracted for development and integration, and full-time officers working with state governments and private sector institutions for onboarding. • During the adoption and expansion phase, workforce within NHA expanded to a broader group of full-time officers focused on adoption strategy, expansion, and operations while a short-term team was retained for tech support and procurement functions. 	<p>In India, during the planning phase, a section of the National Digital Health Blueprint released in 2019 provided information on budget, type of skills, and type of organization required to run a digital health strategy. This budget was subsequently approved for 5 years. An update to the budget is due in 2025, so evaluation activities are expected. Such activities will look at how the financing has been used, what work undertaken, and, based on this, will assess what type of budget and human capacity is required for the next phase.</p>

Source: Authors.

Notes: JLN = Joint Learning Network; HRM = Human resource management; MoHFW = Ministry of Health and Family Welfare; ABDM = Ayushman Bharat Digital Mission; HR = Human resources; RFPs = Request for proposals; IT = Information technology; ICT = Information communication technology; HRM = Human resource management.

partnerships, dedicated investment funds for digital health, and innovative financing mechanisms to ensure long-term viability. Given this, the cycle outlined below is repeated frequently in line with government budget timelines, donor budget requirements, and project-specific budgeting. Table 18 outlines one example of human and financial resource governance activities across the phases.

Coordination

Establishing specialized committees and working groups is also observed over time to ensure coordination, policy direction, and implementation of digital health strategies. These changes highlight the growing recognition of the importance of collaborative governance and the need for specialized structures to effectively manage the complexities of digital health initiatives. Table 19 outlines two country examples of coordination activities across the phases.

Table 19: JLN Country Examples of Initiatives related to Coordination Over Time

Strategic & operational planning	Implementation	Measurement
<p>In the Philippines, initial strategic and operational planning for setting up of a coordination mechanism for digital health governance focused on the following:</p> <ul style="list-style-type: none"> • Agreeing on a “whole-of-government” approach to coordination and inviting relevant government agencies and other stakeholders to participate in the governance of digital health. • Agreeing to use the COBIT 5 governance framework, which separates governance and management functions. • Repositioning the previously set up Programme Management Office (PMO) to be more responsive to the needs of the bodies set up for coordination. 	<p>In the Philippines, implementation of the coordination mechanism saw the following:</p> <ul style="list-style-type: none"> • Setup of the eHealth Steering Committee, Interagency Technical Working Group (TWG). Both functions work together to align, plan, organize all activities. • As the sitting members of the steering committee and TWG are mainly policy and decision-makers, additional combined expertise was needed, experts groups were set up based on specific domains identified for eHealth. Groups for enterprise architecture, data management, data standards, data privacy, ICT infrastructure, for example, were set up • Specific tactical teams to operationalize and undertake the activities for each of the domains were set up 	<p>In the Philippines, monitoring and evaluation activities regarding the coordination mechanisms are undertaken by the PMO.</p> <p>For example, after the initial implementation of the coordination mechanism, an evaluation found that the governance framework had become too difficult to manage, with 11–13 expert groups and 2 tactical teams set up, often with the same experts sitting in multiple groups.</p> <p>To tackle this challenge, the PMO worked to combine or dissolve certain expert groups, while other groups (e.g., Monitoring and Evaluation and Risk Management expert groups) were dissolved as these critical functions are now embedded in every expert group, rather than treated as separate functions.</p>
<p>Similarly, at the operational level in Ukraine, initial strategic and operational planning within the National Health Service of Ukraine (NHSU), MoH, and state-owned enterprise (SoE) required an agreed approach to coordination. It was agreed that a coordination mechanism needed to be set up to enable them to closely engage and synchronize their work.</p>	<p>In Ukraine, the implementation of the agreed coordination of operational activities between NHSU and MoH involves the following:</p> <ul style="list-style-type: none"> • Projects are undertaken by a team made up of a product owner (from NHSU), project manager (from SoE), business analytics (from SoE), lawyers (from MoH, typically), and the “customer of the project.” • They coordinate the work through regular meetings and conversations. • A project typically starts with the development of a policy paper outlining results expected from the project, and a software development lifecycle (SDLC) approach, adapted to the realities and specifics of the context and project, is used. 	<p>It is common to have key indicators that are evaluated in terms of achieving the goal defined in the project policy. Also, according to Ukrainian legislation, the status of implementation of regulatory documents that accompany almost every project has a separately defined monitoring procedure.</p>

Source: Authors.

Notes: JLN = Joint Learning Network; ICT = Information communication technology; MoH = Ministry of Health.

Implementation Challenges Also Differ Over Time

Challenges for realizing the different dimensions of digital health governance change over time as digital health ecosystems progress. Initial challenges may be legal as well as policy barriers due to outdated or nonexistent regulations that are relevant to the development of digital health. Resource limitations can also be a challenge as significant investments are required to build infrastructure, train staff, and create new roles. Early efforts may struggle with gaining broad stakeholder engagement and buy-in. As implementation of initiatives commences, coordination of stakeholders may prove challenging, particularly in decentralized systems, along with interoperability challenges and issues with data quality until appropriate standards and protocols are developed and implemented. Once foundational dimensions of digital health governance are set up, challenges may include security and privacy concerns related to the adoption of new technologies in the health sector. Some challenges may linger and require continuous attention. Securing ongoing funding and resources to support digital health initiatives beyond initial grants and investments, keeping up with rapid technological changes, and integrating new innovations into existing systems are some examples. Table 20 outlines key takeaways on implementation challenges over time as described by the participating JLN countries.

Table 20: JLN Country Experiences related to Implementation Challenges and Key Takeaways Over Time

Key takeaways	
Cross-cutting	<ul style="list-style-type: none"> Implementing sustainable measures to ensure long-term success is a constant challenge. Building political buy-in and strengthening governance related to financial resources can enable financial sustainability.
Regulatory instruments	<ul style="list-style-type: none"> Regular updates to regulation, policies, and guidelines are essential to keep pace with technological advancements. Robust data protection measures, including aligning with international data protection standards and transparent communication are essential for public trust. Public concerns about data privacy and security emerged more strongly over time, highlighting the importance of transparency and public engagement.
Institutional leadership	<ul style="list-style-type: none"> Establishing a multitiered governance structure for effective coordination and oversight is challenging but necessary. The challenges may be overcome through various approaches, including adopting a governance framework and exploring optimal coordination mechanisms across levels of government, among others.
Governance of human and financial resources	<p><i>Human resources</i></p> <ul style="list-style-type: none"> Attracting, training, and retaining a skilled IT workforce is a major challenge but crucial for supporting digital health initiatives. Attracting skilled workforce may be achieved by seeking means of bringing salaries closer in line with the private sector or providing nonmonetary incentives, while retention may be achieved through professional development opportunities. Integrating digital competencies into professional standards for health care staff requires robust training, certification, and hiring systems. Establishing foundational infrastructure is critical for the success of digital health initiatives, and training is critical to overcome data collection challenges, including accuracy and quality. Transitioning from paper-based records to electronic health records (EHRs) requires significant effort in developing a single electronic EMR platform and training health care providers to help ensure data security. <p><i>Financial resources</i></p> <ul style="list-style-type: none"> Securing sufficient funding for digital health governance activities requires clear guidelines and plans for donor negotiations. Clear financial plans, a sustainable financial model, and donor engagement are vital for securing necessary resources. Health facility requests for budget to support digitalization efforts require careful consideration of potential funding models.
Coordination	<ul style="list-style-type: none"> Early involvement of stakeholders helps build consensus and address potential challenges.

Source: Authors.

Notes: IT = Information technology; EMR = Electronic medical record.



**LESSONS FROM
GOVERNANCE
PRACTICES IN
OTHER SECTORS**

Digital transformation successes across countries and sectors provide useful lessons to be considered in the context of governance practices for digital health. Eight core lessons are presented below, each with implications for countries striving to advance digital health governance.

1. Work to Gain and Sustain Political Commitment

As highlighted earlier in the report, a political commitment to digital health among national- and subnational-level decision-makers is a fundamental enabler of realizing a digital health vision. Political commitment has been noted as an important enabler of digital transformation more widely, including in the context of digital infrastructure for payments (Di Giulio and Vecchi 2023). Gaining political commitment for digital health requires a clear understanding of the decision-makers and key stakeholders, which oftentimes will include those outside of the health sector. Beginning the process of engaging them requires a clear understanding of who they are and how digital health aligns with their focus areas and priorities. Once these details are known, the case can be made for digital health governance more successfully. As digital health initiatives are developed and implemented it is also critical to sustain political commitment by continuing to show their value and engage decision-makers and key stakeholders in strategic planning, achieved through the development of an institutional model and effective coordination mechanisms.

2. Set a Strategic Direction with Multilevel Support

Once political commitment is secured, a key lesson from digital transformation projects internationally is the importance of setting a clear strategic direction across all levels of government and ensuring wide legislative support to minimize resource-intensive stop-starts and alterations in the strategic vision (Meyerhoff Nielsen 2019). In the context of digital health governance, the lesson here is to work on setting a clear strategic direction across national and subnational levels. While this may pose a challenge based on the governance arrangements in countries, there are several examples presented throughout the report that discuss engagement of different stakeholders and between national and subnational levels, including in the context of federations. In some cases, ensuring parliamentary support for actions that are required to enable digital health governance (e.g., passing of laws and regulations, setup of government-wide institutions to govern digital health, etc.) will also be appropriate and relevant.

3. Set Up a Coordination Mechanism Across Levels of Government and Key Stakeholders

As noted, the importance of successful coordination across different levels of government and key stakeholders is a critical component of effective governance for digital health that has also proved fundamental in digital transformation projects internationally. Lessons from Denmark's approach to digital transformation include the importance of a strong mandate for coordination across different levels of government. In the case of Denmark, this was achieved through the Portfolio Steering Committee (PSC), which includes key central government actors responsible for various sectors such as social services, tax, education, and health (Meyerhoff Nielsen 2019; Meyerhoff Nielsen and Jordanoski 2020). This permanent steering committee facilitates better cross-sectoral coordination as each strategic initiative in the portfolio action plan has a steering committee, enabling effective coordination and cooperation among different government agencies and local authorities. Examples are presented throughout the report, and discuss coordination in the context of digital health governance, and provide potential blueprints on how coordination activities can be planned, implemented, and monitored.

4. Ensure Cooperation Through a Shared Understanding of the Value of Governance

Like coordination, cooperation requires different levels of government and key stakeholders to have a shared understanding of the value of digital health and its governance, and consensus on the strategic direction. Successful cooperation stems from a sense of joint ownership. Denmark's approach to digital transformation emphasized an intergovernmental cooperation and consensus culture for strategy formulation and implementation through a consultative process involving local authorities, private sector, and academia (Meyerhoff Nielsen 2019). In the context of digital health governance, such cooperation is also critical given the level of technical integration required between systems. In Italy, for example, the creation of a national information system for the health and education sectors involved significant integration among different organizations to ensure the smooth delivery of public services (Di Giulio and Vecchi 2023). It was important that those involved in the development of the information systems understood the different ICT systems deployed and their technological interdependencies, to develop appropriate governance and coordination arrangements.

5. Connect Operational-Level Governance with Strategic Direction and Initiatives

Governments typically leverage two levels of governance to ensure that the digital government strategy is successfully implemented and embedded into public sector operations, first through the development of a body for strategic coordination, and second, through a body for operational coordination (OECD 2019a). At the operational level, linking mandates across steering, program, and project committees, for example, has helped ensure operational performance in line with the strategic direction and initiatives at the strategic level (Meyerhoff Nielsen 2019). The OECD notes that collecting granular project data can further strengthen strategic planning and implementation of initiatives, and assessment of the impact of strategies can provide operational agility to realize strategic direction. On the latter point, Colombia's GEL Index (Índice Gobierno en Línea) is described as a positive example. The GEL Index was developed to assess the implementation of Colombia's digital government strategy and has enabled the central coordinating unit to assess and rank the implementation of digital government policies by all public institutions centrally and subnationally, with its publication encouraging institutions toward strategic alignment and compliance.

6. Continuous Monitoring, Assessment, and Improvement Are Essential to Enable Improvements and Foster Transparency

The importance of monitoring, evaluation, and improvement of governance activities in facilitating successful digital transformation is widely recognized. For example, in Denmark ex ante and ex post evaluations are conducted at the end of each strategic cycle to identify weaknesses and focus on improvements for the next cycle. This continuous assessment process is exemplified by the adjustments to strategic initiatives based on evaluations and feedback. Improved governance, intergovernmental cooperation, and management of ICT initiatives is now a recurrent strategic theme in Danish eGovernment strategies (UNU-EGOV and ILO 2022). This model helps minimize the risk of failure based on lessons learned and facilitates benefits realization at project and strategy levels. The importance of monitoring in the context of digital health governance is discussed in the Key Activities to Develop Digital Health Governance section as one of three phases of digital health governance activities. Monitoring is relevant to all digital health governance dimensions and is fundamental to the values of transparency and openness presented in the Values and Enablers of Digital Health Governance section, above.

7. Leverage Key Performance Indicators to Provide Greater Clarity and Drive Performance

Key performance indicators (KPIs) across strategic and operational levels help align digital transformation initiatives with business strategy. KPIs are increasingly used to monitor and evaluate digital government initiatives. In the case of Thailand, government agencies have been urged to advance digital government under the “Government 4.0” scheme (UN Department of Economic and Social Affairs 2024). Alongside, digital government transformation is one of the key processes selected for monitoring and evaluation within a framework of national KPIs, adopted to encourage all government agencies to meet predefined standards in the implementation of government initiatives. In the context of digital health governance, existing examples of KPI usage were for vendors recruited to provide technology or services as part of digital health transformation activities. However, there is an opportunity to leverage the use of KPIs as part of coordination mechanisms to create greater clarity of goals and drive performance in the delivery of strategic and operational initiatives across digital health governance dimensions. The OECD notes, however, that although most OECD countries use KPIs linked to the individual initiatives (e.g., outputs indicators), they rarely utilize performance indicators (e.g., outcome indicators related to the overall objectives of the strategy or of broader national policies) or impact assessments, which can both be used in monitoring and evaluation activities to provide clarity and driver performance (OECD 2019a).

Lessons From the Identification for Development Agenda

The World Bank’s Identification for Development (ID4D) Initiative was created to realize the potential of inclusive and trusted identification (ID) systems, including civil registration.¹² Several principles for designing an ID system across inclusion, design, and governance pillars have been set out.¹³ The key principles within the governance pillar include the following:

- ▶ **Principle 8:** Safeguarding data privacy, security, and user rights through a comprehensive legal and regulatory framework focused on the need for ID systems to be underpinned by policies, laws, and regulations that promote trust.
- ▶ **Principle 9:** Establishing clear institutional mandates and accountability, including clear accountability and transparency on the roles and responsibilities of identification system providers.
- ▶ **Principle 10:** Enforcing legal and trust frameworks through independent oversight and adjudication of grievances to ensure that all stakeholders appropriately use identification systems to fulfill their intended purposes.

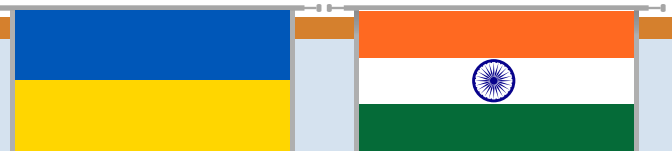
Each of these three principles ultimately seek to enable continuous improvements and foster transparency through governance mechanisms to support the ID4D agenda. Principle 10 outlines that the use of ID systems should be independently monitored to ensure that “all stakeholders appropriately use identification systems to fulfill their intended purposes, monitor and respond to potential data breaches, and receive individual complaints or concerns regarding the processing of personal data.”¹⁴ Where concerns are raised, there should be a mechanism set up for review by independent administrative and judicial authorities to provide a suitable response.

In the context of digital health, such principles and associated activities are also important in ensuring systems will be developed with privacy by design, and health data will be generated, stored, analyzed, used, and disposed of appropriately. The development of oversight and adjudication of grievances will also strengthen confidence and trust.

8. Take a Flexible and Agile Approach to All Dimensions of Digital Health Governance to Better Achieve Intended Outcomes

As part of digital transformation, ensuring that initiatives are flexible and scalable can accommodate future technological advancements and evolving eGovernment needs. As noted in the Developing an Agile Regulatory Framework section, the approach involves the development of regulations and standards around an emerging field (e.g., digital health) iteratively, with a focus on the impacts on the economy and society of emerging technologies. However, a broad, sweeping, flexible, and agile approach to all dimensions of digital health governance, and relevant initiatives, can further enable countries to learn from failures and adapt their approaches accordingly. For example, in the Philippines, the initial approach to setting up expert groups on digital health as part of the approach to digital health governance was found to be suboptimal. To tackle this challenge, a practical resolution was sought and implemented using an agile approach. This example is an important lesson for digital health governance as, where possible, initiatives should be designed in such a way that they can easily be adjusted if they are not achieving their intended aims.

Promising Practices from Nonhealth Sectors Observed by JLN Representatives from India and Ukraine



In India, the financial sector, particularly the Unified Payments Interface (UPI) and the Indian banking industry, serves as a key example. The Reserve Bank of India (RBI) played a crucial role in driving digitalization within the banking sector, highlighting the need for a dedicated health regulator in India to facilitate digital health initiatives. The success of UPI was built upon existing digital infrastructure like core banking and online banking, demonstrating the importance of developing foundational digital public goods like Aadhaar (national ID) before embarking on large-scale digital health initiatives. UPI's success is attributed to its interoperable nature, allowing seamless transactions across different banks, which emphasizes the need for interoperable systems in digital health to enable data exchange between various health care providers and platforms. Other relevant examples include the Goods and Services Tax Network (GSTN), expected to play a role in the National Health Claims Exchange, and Electronic Know Your Customer (E-KYC), which simplified financial transactions and demonstrated the potential of digital identity verification in health care.

In Ukraine, the Ministry of Digital Transformation (MDT) drives digitalization across various sectors. The centralized approach to digital health, driven by the National Health Service of Ukraine (NHSU), offers advantages in data collection, interoperability, and national-level monitoring. MDT's "digital first" policy, requiring all new government services to be digital, provides a valuable model for the health sector. MDT's coordination with other ministries, like Social Security, highlights the importance of cross-sectoral collaboration for successful digital initiatives. Other relevant examples include Ukraine's secure data exchange system, modeled after Estonia's X-Road System, which facilitates information sharing between government bodies and registries, and MDT's digital screening process for legal acts, ensuring that new regulations prioritize digital solutions.

Key lessons from the two countries include the importance of the following:

- ▶ Dedicated regulators to oversee digital health initiatives and ensure data security and privacy
- ▶ Foundational Digital Public Goods such as national ID systems and secure data exchange platforms
- ▶ Interoperable systems for seamless data exchange between stakeholders
- ▶ Cross-sectoral collaboration to leverage expertise and resources from other sectors
- ▶ Citizen-centric approach to ensure digitization initiatives meet citizens' needs and expectations

Conclusion

Sound digital health governance is integral to unlocking the potential benefits of digital transformation in the health sector. As digital health technologies become more advanced and their role in the delivery of health and other public services increases, it is essential that countries work toward developing well-functioning digital health governance frameworks to set and drive the direction of digital health. Such frameworks must bring together infrastructure, laws, economic policies, and institutions relevant to digital health and respond to the changing needs and objectives of the nation as technology evolves.

This report describes various digital health governance dimensions and their implementation, with insights in the development of digital health governance frameworks from eight countries. It is designed to provide in-depth information on each dimension to aid countries and other interested stakeholders to understand the fundamental concepts and dimensions of digital health governance and learn from the experiences of other countries.

Nonetheless, there is no single approach to developing digital health governance frameworks, and the wealth of information presented in this report highlights the varied approaches that have been, and may be, explored. Aligning planning to core values is fundamental to the development of good governance, as is the understanding that initiatives and progress may not be linear but respond to the complex realities of public governance, the health sector and service delivery, and rapidly advancing digital technologies.

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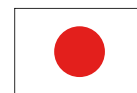
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End Notes

- ¹ The report defines “power as the ability of groups and individuals to make others act in the interest of those groups and individuals and to bring about specific outcomes.”
- ² Based on definitions from the Inter-American Development Bank (IDB), the Broadband Commission, the United States Agency for International Development (USAID), the World Health Organization (WHO) and International Telecommunications Organization (ITU), and the Asian Development Bank (ADB).
- ³ Public intent data are data collected for public purposes while private intent data are data collected for private purposes.
- ⁴ See <https://healthdataprinciples.org/>.
- ⁵ See <https://www.oecd.org/en/topics/policy-issues/multi-level-governance.html>.
- ⁶ WHO's health system building blocks are governance, financing, medicines, vaccines and medical equipment, health information, health workforce, and service delivery.
- ⁷ See <https://doctorsbx.abdm.gov.in/home/about> and <https://www.eka.care/services/what-is-hpr-hfr-phr-in-ayushman-bharat-digital-mission>.
- ⁸ See <https://abdm.gov.in/dhis>.
- ⁹ See <https://dashboard.abdm.gov.in/abdm/incentivescheme>.
- ¹⁰ See previous endnote.
- ¹¹ See <https://ghs.gov.gh/ghs-governance-system/> and <https://crcc.gov.gh/departments-of-rcc/>.
- ¹² See <https://id4d.worldbank.org/>.
- ¹³ See <https://id4d.worldbank.org/guide/pillar-3-governance>.
- ¹⁴ See previous endnote.

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