Social Protection and Health Division's

Approach to Digital Transformation: Guidelines and Recommendations

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IDB

Digital transformation is changing lives, however digital tools are not, and never will be, “silver bullets” that improve quality, safety and efficiency on their own. The added value of Digital transformation for health for the social sector is that by harnessing the power of digital tools, we can re-design social protection and health services to be more personalized for the people of Latin America and Caribbean.

+Digital allows us to reach more people, with more quality, and use more data to provide more and better services.

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Contents

Foreword

Digital transformation is here to stay, as evidenced by the growing consensus among the global community.

The adoption of a digital health resolution by the delegates to the 71st Assembly of the World Health Organization in 2018 is a signal of this consensus. The resolution urges countries to prioritize the development and greater use of digital technologies in health to promote universal health coverage and advance the Sustainable Development Goals. Moreover, health technology start-ups are proposing innovative ideas in a **wide range of areas**, including image analysis, patient monitoring, drug discovery, and early diagnostics, among others.

A strategic approach to the adoption of technology in health and social protection is needed, and it must be capable of discerning the signal from the noise in a very noisy technological environment. We also need to learn from others' mistakes in the implementation of digital projects and see our investments as part of a larger ecosystem to which we need to contribute.

To that end, in 2018 the Inter-American Development Bank took a major step forward by endorsing the **Principles for Digital Development**. These nine principles offer a strategic approach to investing in the digital transformation of health and social protection.

This document describes the approach of the Social Protection and Health (SPH) Division to digital transformation and lists guidelines that we will follow as part of our technical and financial support to countries in the region. By utilizing the Principles for Digital Development as a framework, SPH provides a systematic approach for investments in the digital transformation of health and social protection.

Ferdinando Regalia
SPH Division Chief

Executive Summary

The potential of digital technologies to help deliver quality universal health coverage is well established. But progress in the digital transformation of the health sector has lagged, especially in Latin America and the Caribbean (LAC), because the sector is so complex. Of the 19 countries included in a 2016 study by the Pan-American Health Organization (PAHO), only 52.6 percent have a national electronic health records (EHR) system and only 26.3 percent have legislation that supports the use of such systems. Furthermore, the data available are often of low quality and are fragmented across systems.[1]

The LAC region has large deficiencies in quality and efficiency, two areas in which digital transformation of services has significant potential. Adverse event rates in the region are around 11 percent in hospitals and 5 percent[2] in ambulatory care.[3] If countries in LAC reach the levels of their most efficient peers, even while keeping public health spending stable, people there could live four more years, on average.[4]

In the area of social protection, most countries show even less development in digital transformation, although they have been evolving quickly. But there are still no open standards to promote interoperability, maturity models, or open source communities, such as OpenMRS. However, LAC is making progress on constructing interoperable socioeconomic databases. One such example is Costa Rica's SINIRUBE, a social protection information system that interoperates with administrative education and health data. Countries such as the Dominican Republic and Colombia are also starting to use machine learning tools to improve their data quality and make informed decisions regarding the selection of beneficiaries of social programs.

As part of its renewed strategy for digital development in LAC, in 2018 the Inter-American Development Bank (IDB) endorsed the **Principles for Digital Development** (PDD). The PDD are considered "living" guidelines, meaning they will evolve and be updated over time. The nine principles were designed to help digital development practitioners integrate established best practices into technology-enabled programs. As an endorser of the PDD, the IDB will seek to embody the concepts of the digital principles, representing them in our work culture and in the policies and processes guiding our international development activities.

This document focuses on how the Social Protection and Health (SPH) Division is applying the principles. Following a discussion in the next section on the importance of digital transformation, each principle will be described in its own section, along with an overview of how SPH will apply the principles and use key performance indicators (KPIs) to monitor progress (see Table 1). In time, this living document will be updated. Although this version's content focuses on the health sector, all of the practices are also applicable to social protection.

1. PAHO (Pan-American Health Organization). 2016.
2. Limo, R., A. Amarilla, F.R. Restrepo et al. 2011.
3. Montserrat-Capella, D., M. Suárez, M., L. Ortiz et al. 2015.
4. Pinto, D., R. Moreno Serra, G. Cafagna et al. 2018.

Table 1. SPH Actions and KPIs for Each Digital Development Principle

Principle	Actions	KPIs
Understanding the Existing Ecosystem	• Define the desired future state of the in-country health system and prioritize the technologies needed to create that vision using SPH's standardized methodology • Understand the current state of digital health in-country, ensuring that countries have an up-to-date readiness assessment, system inventory, and current state architecture of the current ecosystem. This includes an assessment of other development partners' projects to support the country. • Support countries in creating or refreshing their national digital health transformation strategies • Invest in enabling and supporting the foundational areas of the digital health ecosystem • Ensure internal coordination between other social sectors and IDB's work to support digital government, digital identity, and broadband initiatives	• Percent of SPH projects with digital health transformation components that have completed a readiness assessment package • Percent of SPH projects with digital health transformation components supporting the creation or update of the national digital health transformation strategy • Percent of SPH projects with digital health transformation components with members from other sectors
Be Collaborative	• Socialize resources from existing networks to the LAC community through +Digital • Create, curate, and maintain the +Digital platform to jumpstart the e-health community in LAC and beyond • Collaborate with other regional actors to develop regional public goods for use in health information technology (IT)	• Number of digital health tools and documents published in IDB platforms such as Code for Development and +Digital • Number of countries in which concrete products were developed in collaboration with other partners • Number of regional public goods developed to support digital health transformation
Design with the User	• Incorporate agile development methods to develop digital solutions in health projects • Improve internal readiness to apply user-based design and design thinking methodologies in projects Include change management components as mandatory in projects with digital transformation components	• Percent of SPH projects with agile methodologies incorporated in their design • Training delivered to SPH specialists to communicate the importance of designing for the user • Percent of projects with digital transformation components with budget funds dedicated specifically to change management
Reuse and Improve	• Conduct EHR/EMR[5] systems market landscape analysis in LAC • Develop and implement modular, interoperable approaches when designing software • Document resources and tools to +Digital and other platforms	• Percent of SPH projects with agile methodologies incorporated in their design • Training delivered to SPH specialists to communicate the importance of designing for the user • Percent of projects with digital transformation components with budget funds dedicated specifically to change management

5. Electronic Health Record/Electronic Medical Record

Principle	Actions	KPIs
Design for Scale	• Design digital health projects for scale from the start • Invest in enabling factors to design for scale • Ensure funding for ex post evaluation of IDB projects with digital health transformation components to effectively detect which project might be scaled • Develop total cost of ownership analyses as part of the cost benefit analysis of projects • Ensure that part of the budget of IDB projects with digital health transformation components will be allocated to capacity building	• Number of contracts with providers with provisions for scaling up solutions • Percent of SPH projects with digital health transformation components with ex ante evaluation • Percent of SPH projects with digital health transformation components with the total cost of ownership analysis as part of their cost-benefit analysis
Address Privacy & Security	• Ensure that digital projects include privacy and security clauses in contracts and risk matrices • Ensure monitoring and evaluation funding to verify the security of information systems	• Number of risk matrices that include privacy and security measures • Number of projects that include funding for security testing of digital solutions as part of the monitoring and evaluation activities
Use Open Standards, Open Data, Open Source, and Open Innovation	• Ensure SPH projects require the use of international best standards for interoperability • Continue to support the development of open source software as a regional public good • Explore the use of open data portals and their inclusion in national policies with clients • Include data from health and social protection in IDB Numbers for Development	• Number of SPH contributions to IDB's Code for Development • Percent of SPH-supported projects requiring the use of interoperability standards
Be Data Driven	• Be data driven in the internal digital transformation strategy and reporting on progress of KPIs • Include indicators in the project results framework and funding to assess adoption, effectiveness, and cost-effectiveness of digital solutions implemented in our pipeline • Support operational research on how to implement digital transformation (DT) solutions • Ensure that projects that include digital transformation components develop and implement information management and use strategies	• Percent of SPH projects with agile methodologies incorporated in their design • Training delivered to SPH specialists to communicate the importance of designing for the user • Percent of projects with digital transformation components with budget funds dedicated specifically to change management

Principle	Actions	KPIs
Build for Sustainability	• Avoid bespoke systems and conduct market research to better understand existing commercial off-the-shelf and free software before deciding to design customized systems • Approach design of systems with a platform mindset and modular design, as opposed to digitizing silos • Calculate total cost of ownership up front and include a sustainability plan in investments • Support regional networks to improve local capacity through training and knowledge exchange in health informatics	• Number of SPH operations with sustainability and scale plans created as part of their design • Number of solutions with total cost of ownership calculated prior to implementation • Number of programs with long-term human resource capacity-building planning included • Number of people trained in health informatics

Why Digital Transformation in Health?

Now more than ever, the LAC region is becoming aware of the power of emerging technologies to transform our economies, our societies, and even who we are as human beings. As these technologies change our lives, we must reflect on questions of ethics, values, and social impact. For example, how might artificial intelligence be used to influence us? Are cryptocurrencies more effective than existing currencies for promoting social inclusion, and do they increase criminal activity? What kind of skills are needed to thrive in an era where technologies are both more pervasive and more powerful? The magnitude of the changes underway is evidenced by the fact that the term "the Fourth Industrial Revolution" has become common parlance.

It is important to distinguish digital transformation (DT) from digitalization and from information technology (IT). Digitalization refers to using digital tools to automate or store information in a digital form without reengineering existing processes. IT refers to the set of tools needed for digitalization. Digital transformation refers to how technologies fundamentally change rules of engagement, how we work and interact, and how we think.

For example, Amazon has digitally transformed shopping by allowing us to use our phones to purchase goods from a variety of industries that can show up at our homes in less than 24 hours. Amazon uses information that has been digitized and relies on IT tools, but it is the way Amazon seamlessly does business with retailers and logistics that has transformed shopping for its consumers. Similarly, services like Spotify have changed our access to music. Rather than buying a good that plays the music, such as a CD or an MP3, Spotify allows anyone to hear any song they want at any time for a fee. Digital transformation has also had an impact on the airline industry, leading to changes in how customers interact with airlines, how airports work, and how airlines interact with each other.

The health sector is also undergoing a digital transformation. Patients have access to an incredible amount of health information online, where they can research their symptoms on websites such as WebMD or Mayo Clinic. Some may even consult artificial intelligence tools about a diagnosis or to confirm test results. Barriers to access can be reduced thanks to advances in telemedicine, allowing for communication with specialists and patient monitoring in real time. Patients may make appointments, renew their prescriptions, or speak to their doctor through online patient portals.

Furthermore, advances in medicine are quickly outpacing health care providers' ability to learn about them. New medical articles are appearing at a rate of at least one every 26 seconds. If a physician were to read every medical journal published, they would need to read 5,000 articles each day.[6] Given the incredible complexity of providing care, many providers rely on decision support tools that help them to cross-check medications for contraindications, help them stay up to date on best practices, and remind them of screenings or check-ups their patient may need.

However, given the complexities of health and health care, the digital transformation process has gone slower than hoped and has not reached everyone in the same way. Health care is a particularly difficult sector to transform; it generates arguably the most sensitive data (personal health information), relies on multiple types of information (diagnostics, prescription, lab tests, images, billing, clinical notes)

Figure 1. Patient's Drawing of Her Experience at the Doctor's Office

Source: MIT Technology Review (2018).

6. Garba, S., A. Ahmed, A. Mai et al. 2010.

that need to be standardized if they are to be meaningfully aggregated, and has a legacy of siloed systems. Moreover, greater reliance on and use of EHR systems has changed the fundamental dynamic between patient and provider. Given how much information providers must enter electronically, both patients and providers report dissatisfaction at having less time available to speak face-to-face.

The digital transformation of LAC's health sector has shown mixed results. Although there are many small pockets of success stories, as there are in most of the world, few large-scale transformations exist. According to the World Health Organization's Global Observatory for eHealth, most LAC countries do not have a National eHealth Strategy.[7] A recent report by PAHO indicates that only 52.6 percent of PAHO countries have a national EHR system and only 26.3 percent have legislation that supports the use of such systems.[8]

Many countries have various information systems that don't identify individuals by name or identification number and lack interoperability, thereby creating silos of duplicated information, often with poor data quality as well. Furthermore, the available data are often used only for reporting purposes, not for making decisions about patient care or managing processes. International donors and organizations have not helped this issue, at times having prioritized urgent needs for data over longer-term capacity building within the country.[9] As a result, there are various fragmented, parallel health information systems (HIS) focused on the needs of donors instead of the countries' priorities.[10]

Additionally, demands for new indicators, such as alternate measurement and reporting requirements, place a considerable burden on these stressed data systems—many of which lack the budget and personnel to address these increased requirements. Several donor agencies have taken note of this problem and are actively working together to correct it through efforts such as the **PDD** and the **Digital Investment Principles**.

To increase the functionality and usability of systems, It is critical to align digital tools with local health strategies, ensuring that the tools are being designed to solve the most pressing problems in health care—not to act as automated reporting mechanisms. To do otherwise is to start with the solution rather than the problem. Two huge challenges currently facing health systems in LAC are quality of care and efficiency, and these are two areas in which digital interventions have shown the clearest potential.

Studies on **quality of care** in Latin America show that the rate of adverse events hovers around 11 percent in hospitals[11] and 5 percent in ambulatory care.[12] In Mesoamerica, less than one in every five obstetric complications and one in every 10 neonatal complications are treated according to national norms.[13] In Colombia, only 15 percent of diabetic patients received care according to national standards, including annual exams for sugar, cholesterol, and renal function.[14]

Similarly, LAC lags in **efficiency**. A recent IDB publication shows that for each of the eight efficiency indicators analyzed, LAC's average efficiency is lower than the Organisation for Economic Cooperation and Development countries', and 22 of the 27 LAC countries are in the bottom half of the rankings while 12 are in the bottom 25 percent.[15] If LAC countries reached the levels of their most efficient peers, even while keeping public health spending stable, people could live an average of four more years. Potential gains in life expectancy could reach at least seven years in Bolivia, Guyana, Suriname, and Trinidad and Tobago.[16]

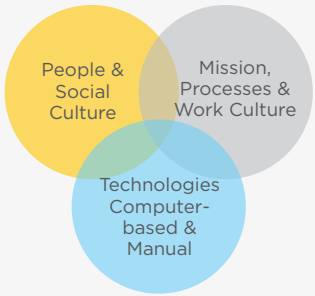
7. Pan American Health Organization (PAHO), 2016
8. Novillo-Ortiz, D. 2016.
9. AbouZahr, C., and T. Boerma. 2005.
10. Palacio-Mejia, L.S., J.E. Hernández-Avila, A. Villalobos et al. 2011.
11. Limo, R., A. Amarilla, F.R. Restrepo et al. 2011.
12. Montserrat-Capella, D., M. Suárez, M., L. Ortiz et al. 2015.
13. Mokdad, A., 2018.
14. Pinto, D., R. Moreno Serra, G. Cafagna et al. 2018.
15. Pinto, D., R. Moreno Serra, G. Cafagna et al. 2018.
16. Pinto, D., R. Moreno Serra, G. Cafagna et al. 2018.

Most countries have no or very little information on how resources are allocated by function (for example, curative versus preventive), health care level (primary, secondary, tertiary), or economic classification (for example, salaries, equipment, infrastructure), which speaks to the discretion and lack of analysis with which allocation decisions are made.[17] Collecting this data and improving the efficiency of the region's health systems would be critical, as efficiency is also considered to be a key component of the regional strategy toward universal health coverage.[18] It is important to keep in mind that health IT on its own is not and never will be a silver bullet that improves efficiency and management or reduces unsafe conditions, errors, and adverse events. Although technologies are required to make these changes possible, digital transformation cannot occur without the reengineering of health care processes.

Essential elements of digital transformation in health care. Digital transformation requires alignment with or buy-in from three major, interrelated components: 1) the mission, processes, and work culture of the organization; 2) the people who carry out this work; and 3) the tools and technologies (including hardware and software) that people use to do the work. Success requires the mission to be supported with continuously improving processes, motivated staff who support change, and the useful and usable technologies that staff would use.[19]

Successful digital transformation has demonstrated important results in the health sector in three main categories: 1) health care system structures, 2) health care processes, and 3) health care outcomes.[20] If correctly implemented, digital transformation tools can positively affect each of these categories. The transition to EHR systems is one such example.

EHR systems, although defined somewhat differently by different organizations, generally have three characteristics in common.[21] The first is data is available at the individual level. The second is longitudinal capacity. This is what allows a system to record all health-related information at the individual level over time. The third is interoperability. This characteristic refers not only to the possibility of exchanging health information within and between health service providers but also to the ability to use information that has been exchanged—functions which are achievable because of projects' adherence to recognized data and technology operations standards. The combination of these characteristics permits EHR systems to reach their primary objective, to support continuing, efficient and quality integrated health care. The primary use of this data is the point of care by the patient and provider, but it can have various secondary uses, including population and public health and research. In the literature, results are many times attributable to specific



Success requires the mission to be supported with *continuously improving processes, motivated staff who support change and the useful and usable technologies* that they would use.

Figure 2. Three Key Elements for Macro-ergonomic Digital Transformation

Source: Dowling (1985, 2018)

Note: Macroergonomics is a design and analysis concept that recognizes that any holistic "human-machine" system, inclusive of HIS, has thress interrrelated components: 1) the mission, processes, and work culture of the organization; 2) the people who carry out this work in their business and social culture; and 3) the tools and technologies (including hardware and software that people use to do the work.

17. Pinto, D., R. Moreno Serra, G. Cafagna et al. 2018.
18. Cid, C., E. Báscolo and C. Morales. 2016.
19. Dowling, A. 1989.
20. Hypponen et al. 2014.
21. Please see forthcoming paper from Cafagna, Nelson and Tejerina regarding EHR system definitions for more information.

software functionalities, such as order-entry management or clinical decision support systems, therefore it is important to understand how organizations and researchers are using the term.

We discuss EHR systems as a target for digitization throughout this paper for two main reasons: 1) there is a considerable amount of evidence on the impact of EHR systems and 2) more and more LAC countries are including the development, implementation, and use of EHR systems in their development agendas to support continuing, efficient and quality integrated healthcare. Table 2 provides a brief overview of how EHR systems have affected health care system structures, processes, and outcomes.

Digital transformation tools have also been shown to reduce operational costs. For example, the use of artificial intelligence in Sao Paulo has reduced the costs of a specialized consultation by 60 percent and the time to receive diagnostic results from 60 days less than one hour.[22] The use of telemedicine

*The terms **Electronic Health Record** (EHR), "**Electronic Health Record system**" (EHR-S), Electronic Medical Records (EMR) and many others, all refer to the information in medical records that was historically kept on paper but is now frequently kept electronically. The exact definitions and terms used vary considerably between countries. We use "**EHR system**" in this paper for the sake of simplicity and refer to the extended EHR definition which includes clinical and non-clinical information and the key functionalities to improve service quality and efficiency according to the Institute of Medicine*.*

* Key functionalities defined by the Institute of Medicine include: Storage and retrieval of health information and data; Results management; Order entry/management; Decision support management; Electronic communication and connectivity; Patient support; Administrative processes; Reporting & population health (Institute of Medicine, 2003)

Table 2. Benefits of Digital Transformation, an EHR System Example

Structures – EHR Systems can contribute to...	Processes – EHR systems can...	Outcomes
• Completeness and quality of information systems[a] • More accurate information that is updated frequently and can be accessed quickly • Improvements in research quality[b] and timely access to higher-quality information • Better public health surveillance and management[c]	• Enhance the quality of care provided to a patient, as they are positively associated with adherence to clinical guidelines, lower medical errors, and lower adverse drug effects[d] • Provide better follow-up on test results and better coordination among different levels of care and within teams of health care professionals[e] • Reduce the cost of redundant diagnostics, which are necessary if a provider does not have access to the patient's complete clinical information[f] • Reduce the time spent copying data from patients[g]	• Evidence on the impact of EHR Systems are less strong when it comes to health care outcomes • EHR Systems did not show substantial effects on mortality or length of stay in hospital settings[h] • However, computerized decision support systems are more encouraging, as they show reduced relative risk for morbidities on the order of 10–20 percent[i]

a Nguyen, L., E. Bellucci and L.T. Nguyen. 2014. **b** Menachemi, N., and T.H. Collum. 2011. **c** Yang, S., M. Santillana, J.S. Brownstein et al . **d** Campanella, P., E. Lovato, C. Marone et al. 2015. **e** Nguyen, L., E. Bellucci and L.T. Nguyen. 2014. **f** Menachemi, N., and T.H. Collum. 2011. **g** Li, P., S. Ali, C. Tang et al. 2013. **h** Thompson, G., J.C. O'Horo, B.W. Pickering et al. 2015. **i** Moja, L., K.H. Kwag, T. Lytras et al. 2014.
22. Figueroa, R. 2017.

to remotely monitor chronic patients in Brazil has reduced the cost of treatment by 30 percent.[23]

In the United States, the Department of Veterans Affairs has reported a 300 percent annual return on investment on the costs of implementing its digital systems.[24]

Successful digital transformation also provides an opportunity to develop a learning health care system. The learning health care system is defined by the Institute of Medicine[25] as a system in which "science, informatics, incentives, and culture are aligned for continuous improvement and innovation, with best practices seamlessly embedded in the delivery process and new knowledge captured as an integral by-product of the delivery experience."

However, digital transformation also takes time. Governments must identify priorities based on the key problems they wish to solve and develop national strategies in collaboration with all key stakeholders to establish institutional support that will last far beyond a single presidential term.

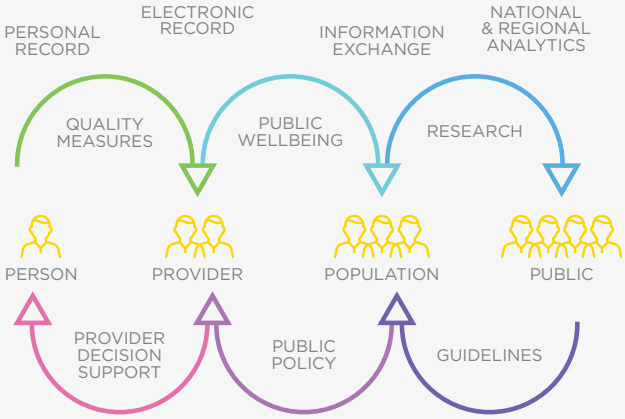


Figure 3. A Vision of the Health IT Ecosystem

Source: Adapted from Office of the National Coordinator for Health Information Technology (2014).

23. GSMA Intelligence. 2017.
24. Byrne, C.M., L.M. Mercincavage, E.C. Pan.
25. Institute of Medicine. 2013.

SPH's Approach

Theory of Action for Digital Transformation and Application of the Principles of Digital Development

SPH facilitates IDB operations in social protection, health, and nutrition[26] and provides direct technical assistance to countries and develops research about what types of interventions work best to improve living standards in the region. In the field of health, SPH provides technical and financial support to promote better health conditions, reduce the risk of poverty associated with health problems, and achieve sustainability of health services for the entire population. Based on international evidence, our assistance has had a measurable impact on helping countries in the region strengthen their health systems, and digital transformation has the potential to help us create an even larger impact.

The IDB endorsed the PDD in 2018, and endorsement of the PDD means that an organization, at its highest levels, agrees to put these principles into practice through its policies, processes, and activities. It is a formal and public acknowledgment of the organization's commitment to designing technology-enabled tools that can reach more people, achieve greater impact, and produce stronger and more sustainable outcomes by actively living out the principles. We will seek to embody the PDD concepts in our work culture and the policies and processes guiding our international development activities.

The remainder of this document lays out SPH's approach to digital transformation, which is designed to improve our support to the region. We use the PDD as the document's framework, so each of the nine sections that follow addresses one of the principles, briefly defining it before addressing how SPH is applying the principle and which KPIs will be used to track and monitor our efforts. It is important to note, too, that SPH's approach to digital transformation is aligned with the Social Sector's vision to create a region that provides more efficient, impactful, and equitable social services by leveraging digital technologies through three main focus areas: 1) the digital identification of beneficiaries, 2) the effective and ethical use of information, and 3) the creation of personalized social services. SPH's work toward these ends will be reflected in the actions and the KPIs.

26. SPH's scope of work encompasses social protection issues such as safety nets, cash transfers, and services for social inclusion such as early childhood development, youth programs, and elderly care services; health, such as health capital investment strategies, health networks strengthening, and health system financing, organization, and performance; and nutrition.

Understand the Existing Ecosystem

PDD definition of this principle: "Well-designed initiatives and digital tools consider the particular structures and needs that exist in each country, region, and community. Dedicating time and resources to analyze the ecosystem, or context in which the work is carried out, helps to ensure that the technology tools selected will be relevant and sustainable and will not duplicate existing efforts. Ecosystems are defined by the culture, gender norms, political environment, economy, technology infrastructure, and other factors that can affect an individual's ability to access and use a technology or participate in an initiative."

Initiatives that do not account for ecosystem challenges are less likely to achieve their objectives or scale—and may lead to unintended consequences. An ecosystem is fluid, multifaceted, and ever-changing, requiring that digital development practitioners regularly analyze it to make sure that its current state aligns with their assumptions about it.

See more at:

https://digitalprinciples.org/principle/understand-the-existing-ecosystem/.

SPH application

Part of understanding the existing ecosystem relies on understanding the many factors that impact health outcomes. The IDB's work in the broader digital ecosystem, which includes the rest of the Social Sector, is critical to improving health in LAC. Improving the social determinants of health and achieving the Sustainable Development Goals requires a comprehensive approach beyond the provision of health services, as 80–90 percent of health determinants are not related to health care. For example, 40 percent are related to socioeconomic status, poverty, race, and education. What we eat combined with our amount of physical activity, smoking, and alcohol use and our other health behaviors accounts for another 30 percent. Our environment, genetics, and health care each make up an additional 10 percent.[27] Pairing data about social determinants of health with data on health care is critical to improving the health of individuals and populations as well as improving policy and practice.

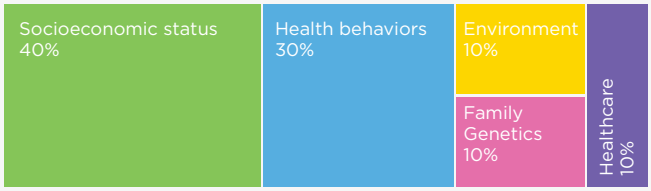


Figure 4. Social Determinants of Health and Their Contributions to Our Health

Source: Adapted from Health Data Matters (2018).

When designing new technological tools, many factors about the environment in which the tools will be implemented are significant. New technology does not exist in isolation, as it relies on the digital foundation built before it. For example, quality and timely health information requires robust identity systems. Scale and sustainability of technologies used by the health sector will depend on reliable connectivity. Interoperability of systems within the health sector and between it and other sectors will require an understanding of the broader digital government ecosystem in addition to an adoption of standards. Moreover, interoperability is particularly important, as past efforts at the digital transformation of health care have been developed in isolation, leading to duplication and a need to rework the systems and obtain additional investments to allow legacy systems to interoperate.

To obtain the minimum understanding of the digital ecosystem, the following practices should be conducted:

- Identification of the rules and regulations that guide digital efforts in the country;
- Assessment of the existing digital ecosystem in the health sector including hardware, software,

27. Tarlov, A.R. 2006.

human resources, and strategic documents for the future; and

- Determination of all of the relevant actors and their contributions to the country's digital investments.

To implement this principle, SPH has created an internal toolkit for team leaders that includes standardized checklists and assessments to be implemented as part of project design. Some of the actions and indicators are described next.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Define the desired future state of the in-country health system and prioritize the technologies needed to create that vision using SPH's standardized methodology
- Understand the current state of digital health in-country, ensuring that countries have an up-to-date readiness assessment, system inventory, and current state architecture of the current ecosystem. This includes an assessment of other development partners' projects to support the country.
- Support countries in creating or refreshing their national digital health transformation strategies
- Invest in enabling and supporting the foundational areas of the digital health ecosystem
- Ensure internal coordination between other social sectors and IDB's work to support digital government, digital identity, and broadband initiatives

KPIs

- Percent of SPH projects with digital health transformation components that have completed a readiness assessment package
- Percent of SPH projects with digital health transformation components supporting the creation or update of the national digital health transformation strategy
- Percent of SPH projects with digital health transformation components with members from other sectors

Be Collaborative

PDD definition of this principle: "Being collaborative means sharing information, insights, strategies, and resources across projects, organizations, and sectors, which increases efficiency and impact. This principle encompasses all the others. People working in digital development have a shared vision to create a better world, and collaboration is essential to making this vision a reality. No single initiative or organization can make it happen alone. We have the most impact when we work together across geographies, focus areas, and organizations and in partnership with local communities and governments. By collaborating, those working in digital development and elsewhere can pool their resources and expertise not only to benefit each initiative but also to strengthen the global community. Collaboration does not just happen accidentally—it requires time, planning, and dedication of resources to look for and develop opportunities."

See more at:

https://digitalprinciples.org/principle/be-collaborative/

SPH application

In the world of open source data and communication, we must be collaborative. SPH plans to contribute new tools and platforms to address health IT challenges in LAC while building off the progress other implementing partners have achieved. This section highlights three ways in which SPH plans to collaborate for the future of a digital health transformation: 1) align with regional and global movements and partners, 2) support and contribute to communities of practice, and 3) use and contribute to existing knowledge repositories and platforms.

SPH is aligned with regional and global movements and partners. The IDB's endorsement of the PDD signals its commitment to aligning itself with existing efforts to improve digital transformation projects. As such, SPH must understand existing efforts by other development partners, researchers, and countries to complement rather than repeat their work at the country and regional levels. This undertaking is directly related to the type of analysis needed to understand the digital ecosystem described in the previous section. SPH has demonstrated its commitment to this idea through its operations in Jamaica. In coordination with the Ministry of Health and PAHO, all parties agreed to use the Information Systems for Health (IS4H) Framework to create one strategic and operational plan for health investments, as opposed to engaging in isolated efforts. SPH will also continue to participate in key technical and strategic working groups within the regional and global digital health community to share progress and avoid replication of investments.

SPH will continue to support and contribute to communities of practice. SPH also plans to strategically contribute to and facilitate established communities of practice. **Communities of practice** are groups of people who share a passion or concern for something they do and learn how do it better by interacting regularly. Online tools and other technology allow members to establish communities of practice across nationalities in new and inventive ways. By leveraging these communities of practice, we plan to both crowdsource knowledge as well as contribute lessons learned from the region to the global body of work on digital health. Several intraregional communities of practice in digital health have formed.

For example, the **Asia eHealth Information Network** (AeHIN) formed in 2007 when 10 Asian countries came together to learn about eHealth research and implement several multinational projects. Since that time, AeHIN has promoted regional knowledge sharing and learning to more effectively leverage IT to improve health outcomes. Today, AeHIN has more than 1,000 members and has produced extensive resources on interoperability standards, strategic frameworks, and legal resources.

Another example is the **American Network of Cooperation on Electronic Health** (RACSEL, for its initials in Spanish). Members include Chile, Colombia, Costa Rica, Peru, and Uruguay. Created in 2014 with IDB support, RACSEL's main objective is to support countries in exchanging knowledge and

experiences to define common standards in creating EHR systems. In 2018, RACSEL produced a series of technical documents, including an institutional framework to create a national digital health strategy, interoperability standards for national EHR systems, and a reference architecture for semantic interoperability. SPH will continue to participate in and promote networks that foster the sharing of information and collaboration in the implementation of digital transformation projects in the region.

SPH will use and contribute to existing knowledge sharing repositories and platforms for health IT. Having identified the need for resources to develop health IT for developing countries, many organizations have compiled resources such as open source code, articles, documents, and frameworks for donors, practitioners, and technologists. Table 3 summarizes a small selection of these resources.

Collaboration in Practice:

The Case of Jamaica & Suriname

In 2018, PAHO's regional Initiative Information Systems for Health (IS4H) was launched to support countries to develop National Plans and Roadmap.

As part of the Regional Strategy for the Americas, Member States requested a Plan of Action supported by a Resolution that will be presented for approval at the PAHO's Directing Council of Ministers of Health, October 2019. IS4H evolves from preconceptions of Health Information Systems that were mainly focused on software selection and implementation for components of electronic health records and vital statistics, and not in many instances conceived as an interconnected and integrated multi-stakeholder effort that ensure information for better care and better policy and decision making, innovation and above all, the protection of personal health information.

The Inter-American Development Bank (IDB) joined the PAHO and MOH collaboration in Jamaica and Suriname and aligned the policy and investment loans to support the goals outlined in the National IS4H strategy. The adoption of this renewed model at the national level has helped to create a clear agenda and one shared plan, coordinate and optimize diagnostic efforts, establish clear results, and bring partners together.

Teams hold joint-missions, discuss strategies and tools, and coordinates support under the leadership of the MOH.

Table 3. Select Digital Health Resources and Repositories

Name	Summary	Great for...
Code for Development	IDB repository of open source digital tools to address development challenges, including in health care	Finding available open source code for specific applications in LAC and elsewhere
Digital Health Atlas	Digital health technology registry platform	Conducting a landscape analysis of available digital health technologies around the world with standardized information
Digital Health Investment Review Tool	Provide high-level guidance based on widely accepted best practices such as the PDD and the Digital Investment Principles that can be used to support strategic investments for digital technologies and the betterment of public and global health	Finding language and tools that can help structure language in requests for proposals, grants, and contracts as well as support informed advice/decision-making by procurement officers considering digital health proposals
Global Digital Health Index	Interactive tool designed to help countries benchmark and monitor their use of digital health over time	Evaluating countries' maturity of and use of digital health tools through standard indicators such as leadership/governance and standards/interoperability
Global Digital Health Resources and Maturity Models: A Summary	Overview of existing tools created by MEASURE evaluation to assist in assessing investments and HIS	Reviewing available tools
Health Data Collaborative	Collaborative formed to strengthen countries' HIS, improve efficiency and alignment in health investments, and increase impact of global goods	Finding resources for issues around health data and case studies from work in Africa
healthit.gov	Website from the United States government with resources for developers, vendors, providers, and individuals	Demonstrating a general overview of health IT and health IT curricula
Information Systems for Health	A suite of tools created by PAHO based on the IS4H framework. The IS4H-Maturity Model is a reference framework to assess the maturity of HIS and assist countries to better operate, interact with, and benefit from increased access to information. The toolkit has various other tools including rapid assessments, functional assessments, and ICT costing assessments. These tools seek to implement a better decision and policy making mechanism through health-related information systems that ensure universal, free and timely access to data and strategic information using the most cost-effective ICT tools	Assessing current status of HIS and creating a national plan roadmap for improvement to establish priorities and guide investments

Name	Summary	Great for...
Methodological recommendations for the measurement of access and use of Information and Communications Technologies (ICT) in the Health Sector	Access to **surveys** and methodologies to assess IT infrastructure and adoption developed by the Economic Commission for Latin America, PAHO, and the Regional Center for Studies on the Development of the Information Society	Providing a baseline for IT assessments and measure progress to allow for regional comparability and standardized measurement
mHealth Compendium Database	Platform that tracks the provision of IT technologies in specific health areas by application type	Identifying examples of specific applications of mHealth technologies
RACSEL technical guidelines for Electronic Health Records	Series of technical documents, including an institutional framework to create a national digital health strategy, interoperability standards for national EHR systems, and a reference architecture for semantic interoperability	Regional recommendations for EHR norms and interoperability and learning about country experiences in LAC in EHR implementation
RELACSIS	Community of practice supported by PAHO and the United States Agency for International Development to improve the quality of data, diagnostics, and health policies related to data in LAC	Training on best practices and the development and use of low-cost/high-impact tools to improve HIS
Stages of Health Information Systems Improvement Toolkit	A suite of tools by MEASURE Evaluation to provide systematic guidance on how to assess the existing status of an HIS and identify specific improvements for an HIS to function optimally	Describing the status of HIS components; identifying HIS improvement goals and milestones; developing a plan, timeline, and needed resources; and analyzing investments to improve data quality and use

SPH will contribute to existing platforms with software and other resources developed with IDB's funding. To ensure that these solutions are well designed and can be understood by others, they must follow certain standards. For example, any open source software in the health sector developed with IDB funding will be required to follow guidelines developed by the IDB's **Code for Development** to ensure that the source code is widely understandable when it is accessed on this platform or others.

SPH also promotes standards that have been created by other implementers and organizations. For example, we will use the World Health Organization's eHealth categorizations in our projects to follow best practices. SPH is currently in the process of reviewing existing tools to be adopted and/or adapted as part of project design.

Inspired by other organizations, SPH is creating a platform to host innovative solutions specifically related to health and social protection for LAC. This new platform, +Digital, represents an added value of digital transformation for the social sector. By harnessing the power of digital tools, we can tailor SPH services for the people of LAC. +Digital allows us to reach more people, provide a higher service quality, and use more data to provide more and better services.

The +Digital platform is a one-stop shop that contains resources such as field action reports, guides and handbooks, learning material, research and publications, toolkits, webinars and videos, and websites. We seek to systematize and facilitate access to existing information, such as relevant laws, governance documents, toolkits, roadmaps, articles, blogs, publications, conferences, and open source code to assist country counterparts who are looking to expand their electronic health and social protection capabilities in LAC, especially in Spanish. We will also intentionally systematize information about projects within the SPH portfolio and include health projects in both +Digital and global efforts, such as the Digital Health Atlas.

Figure 5. +Digital

Source: IDB (2019).

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Socialize resources from existing networks to the LAC community through +Digital
- Create, curate, and maintain the +Digital platform to jumpstart the e-health community in LAC and beyond
- Collaborate with other regional actors to develop regional public goods for use in health IT

KPIs

- Number of digital health tools and documents published in IDB platforms such as Code for Development and +Digital
- Number of countries in which concrete products were developed in collaboration with other partners
- Number of regional public goods developed to support digital health transformation

Design with the User

PDD definition of this principle: "Successful digital initiatives are rooted in an understanding of user characteristics, needs, and challenges. User-centered design—also referred to as design thinking or human-centered design—starts with getting to know the people you are designing for through conversation, observation, and co-creation. Information gathered through this engagement leads to building, testing, and redesigning tools until they effectively meet user needs. By designing with the users, and not for them, you can build digital tools to better address the specific context, culture, behaviors, and expectations of the people who will directly interact with the technology. Designing together means partnering with users throughout the project lifecycle, cocreating solutions, and continuously gathering and incorporating users' feedback."

See more at:

https://digitalprinciples.org/principle/design-with-the-user/

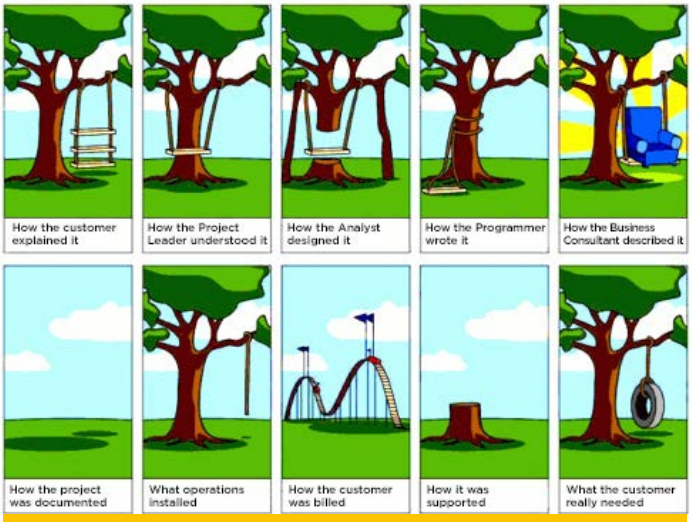


Figure 6. The Deadly Sins of Product Development Prototypes

Source: Project Management Swing. www.picsbud.com. https://picsbud.com/images/project-management-swing-60.html

SPH application

Designing for the user leads to better products and services. However, in many cases, implementing organizations need to be incentivized to ensure that they are focused on the user when designing their digital solutions. Services and tools that have incorporated user input can lead to better adoption and higher rates of user satisfaction.[28] SPH projects can implement user-centered design in three main areas: 1) improving internal readiness to apply user-centered design practices, 2) incorporating agile methods in the procurement of technological solutions, and 3) prioritizing change management strategies while implementing technological solutions.

Internal readiness. The user design process—which involves interviewing beneficiaries, creating personas, and identifying use case scenarios—is not uniformly understood or utilized in project planning and execution. SPH will provide internal training for staff to build internal capacity to socialize the best practices of design and the benefits of design in our projects. We will also work to include these aspects in project design and the design of internal tools and strategies for digital transformation, where appropriate.

Incorporating agile methods. Fiduciary processes in IDB projects are often "waterfall" processes, in which all the technical specifications need to be ready before the request for proposal for a product is launched. An "agile design" is a method in which program implementers develop a concept, test a concept, evaluate how the concept was implemented, adjust, and test again.

While the concept is not new to software developers, it has not been implemented in IDB projects in the health sector, where many of the specific details of digital components are not usually well defined by the time the request for proposals is launched.

28. Zviran, M., C. Glezer and I. Avni. 2006.

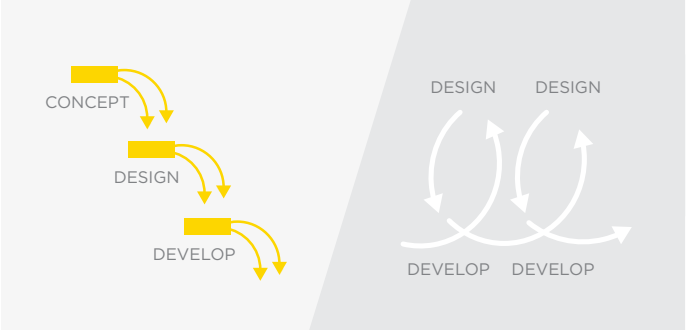


Figure 7. Waterfall (left) versus Agile Design (right) Methodologies

Source: Adapted from Appleyard (2013).

SPH will support the implementation of agile methodologies for the implementation of solutions when identified as an ideal method (i.e., when the specific requirements of the solution to be developed are not well understood at the time of launching the request for proposals). Furthermore, SPH will work with the procurement, legal, and the IT departments to develop internal guidelines for the implementation of agile methodologies under IDB procurement policies.

Change management strategies. Change management strategies are very important components in the implementation of digital transformation processes. As mentioned earlier, digital transformation refers not only to changes in software but also to the reengineering of processes to which many people may feel attached. Change management must be taken seriously by project leads. Otherwise, a project can easily be abandoned because of lack of support or sabotage from people within the institution. Projects with digital transformation components will be required to include resources for continuous change management training of affected personnel.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Incorporate agile development methods in developing digital solutions in health projects
- Improve internal readiness to apply user-based design and design thinking methodologies in projects
- Include change management components as mandatory in projects with digital transformation components

KPIs

- Percent of SPH projects with agile methodologies incorporated in their design
- Training delivered to SPH specialists to communicate the importance of designing for the user
- Percent of projects with digital transformation components with budget funds dedicated specifically to change management

Reuse and Improve

PDD definition of this principle: "Instead of starting from scratch, programs that "reuse and improve" look for ways to adapt and enhance existing products, resources, and approaches. Reuse means assessing what resources are currently available and using them as they are to meet program goals. Improve means modifying existing tools, products, and resources to improve their overall quality, applicability, and impact."

To start this process, identify relevant methods, standards, software platforms, technology tools, and digital content that have already been tried and tested—you can learn about digital development tools that have been piloted or scaled through conferences, blogs, program evaluations, and the digital development community. While an existing tool or approach may not exactly fit all your needs for reuse, consider improving and building on it rather than creating something entirely new. The result will be a tool that is better and more reusable by all because of your improvements. Reusing and improving is not about designing shiny new objects or limiting a technology to internal use; it is about taking the work of the global development community further than any single organization or program can alone. Reusing and improving can also dramatically reduce the time needed for development and testing and reduce your costs.

See more at:

https://digitalprinciples.org/principle/reuse-and-improve/

SPH application

Instead of starting from scratch, SPH will reuse and improve existing tools by looking for ways to adapt and enhance existing products, resources, and approaches whenever possible. To do this, SPH must first identify relevant and available resources, such as methods, standards, software platforms, technology tools and digital content that have already been tried and tested. We will be regularly reviewing tools that track innovations in digital health and social protection through platforms like the Digital Health Atlas and **Kopernik**, an impact tracker technology. We will also continue to participate in working groups with partners to track, identify, and document emerging technological resources to support specialists and clients.

Reusing and improving solutions also requires that the solutions we support and develop are also made with the intention of being reusable. This requirement means that solutions developed with IDB funding need to be well documented and follow style guidelines that will make them understandable for new users. This requirement for reusability extends beyond software development and may include resources such as eHealth architecture, laws, and norms prepared in other countries.

To ensure that all SPH project managers are engaging in the reuse and improve culture, once functional requirements for a solution are defined, SPH will require project managers to guarantee that a due diligence search for existing and available solutions is completed to ensure that no available solutions exist for the problem they want to solve. This verification must be done before the development of custom, bespoke software can be approved. SPH will also allocate resources to document the findings, resources, open source standards, code, and completed projects that include EHR systems and other digital component projects to the +Digital platform to support reusability and advance LAC's digital health learning agenda.

Given the central role of EHR systems, SPH is conducting a landscape analysis of available tools in LAC as well as an assessment of the maturity of EHR systems in LAC. With a deeper understanding of the tools and maturity of EHR systems currently available, SPH will be able to identify which resources and partnerships will be the most beneficial for its member countries. SPH will also be better positioned to assist its clients in selecting which tools may be appropriate to adapt and improve as well as identify where gaps exist and custom solutions may need to be developed. For example, some countries may be able to reuse off-the-shelf software or

existing open source systems rather developing custom software from scratch. We also seek to move toward a modular approach, where investments and platforms used and developed by one project can be reused and improved upon in another.

The +Digital platform will also host SPH's EHR System maturity model and toolkit for the region, a landscape study of current capabilities in the region, and tools outlining the minimum requirements necessary to build certain elements of an EHR system. This maturity model uses domains and questions from existing models but seeks to fill a gap by reviewing capabilities specifically related to operationalizing EHR systems. These resources are meant to be paired with existing tools, such as IS4H's Maturity Model or the Stages of Health Information Systems Improvement Toolkit, which examine the entire health information ecosystem, and will be used in SPH-funded programs implementing EHR systems. This platform will also house information produced from partner communities of practice, such as RACSEL, that have produced framework documents that can be useful to countries in LAC and elsewhere.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Conduct EHR/EMR system market landscape analysis in LAC
- Develop and implement modular, interoperable approaches when designing software
- Document resources and tools to +Digital and other platforms

KPIs

- Current EHR/EMR systems and other IT landscape assessment conducted and updated regularly
- Number of digital contracts that include stipulation on interoperability
- Number of e-health and digital projects uploaded to +Digital
- Number of projects that reuse/improve upon tools developed in a previous project

Design for Scale

PDD definition of this principle: "The goal of achieving scale has been elusive for many digital development practitioners. The mHealth field, for example, has identified the problem of pilotitis, or the inability to move initiatives beyond the pilot stage. Achieving scale can mean different things in different contexts, but it requires adoption beyond an initiative's pilot population and often necessitates securing funding or partners that take the initiative to new communities or regions. Different implementers may define scale as reaching a certain percentage of a population or a certain number of users."

Designing for scale means thinking beyond the pilot and making choices that will enable widespread adoption later as well as determining what will be affordable and usable by a whole country or region rather than a few pilot communities. You may need to evaluate the trade-offs among processes that would lead to rapid start-up and implementation of a short-term pilot versus those pilots that require more time and planning but lay the foundation for scaling by reducing future work and investment. By designing for scale from the beginning, your initiative is more likely to meets user needs, and if it has a local impact, it can be expanded more easily to new users, markets, regions or countries.

See more at:

https://digitalprinciples.org/principle/design-for-scale/

SPH application

SPH aims to increase the number of projects with digital health transformation components that are successfully scaled. "Scaled" can mean both expanding coverage area in one country or sharing tools between countries. Over the last several years, SPH has implemented a number of small-scale SPH digital health projects (for an overview of these projects, refer to Annex 1). After two to three years of implementation, they are now being prepared for scale-up. However, the scale needs to be built in directly to project design. To increase the percentage of projects that are successfully scaled, SPH will continue funding pilot projects and progressively include enabling factors for their implementation at scale. The PATH Digital Health Solutions group—another organization that officially endorsed the PDD[29] —identified four main enabling factors: the right leader, the right solution, the right approach, and the right capacity.[30]

The right leader refers to the necessity of obtaining support from a leader (or a group of leaders), which can increase interest in a project. Increasing interest is crucial because perceptions and attitudes toward a project are as important as the project itself in order to achieve scalability.[31]

The right solution refers to identifying effective projects that can be scaled as well as to financially sustainable models. To better identify which projects are effective, SPH is committed to performing ex ante evaluations and ensuring funding for ex post evaluations of projects with digital health transformation components. It is worth noting that the effectiveness of a project does not necessarily imply its scalability. Therefore, SPH will perform an in-depth analysis to assess if an effective project can be adapted to a different context. As for the development of financially sustainable models, SPH will increasingly develop total cost of ownership[32] analyses, as part of pilot implementations, to be included in the economic analyses of projects. Projects also require a strategic approach to be scalable, such as ensuring that pilots pre-negotiate prices with providers for scaling up products to avoid being subjected to higher prices once a pilot is successful.

29. For more information, see https://path.org/articles/change-takes-time-but-not-too-much/.
30. Wilson, K., B. Gertz, B. Arenth et al. 2014.
31. Huang, F., S. Blaschke and H. Lucas. 2017.
32. Total cost of ownership includes the cost of maintenance, modifications needed, personnel for implementation, and change management, among others.

The right approach refers to supportive policies, regulations, and standards to scale up an intervention as well as robust program management to ensure that solutions are effectively embedded into existing practices and systems. Few digital health innovations have been scaled without considering enabling policies, regulations, and standards. For example, a successful pilot project on the use of telemedicine cannot be sustained without updating norms, legal regulations, and budgets to fully incorporate all the implications of telemedicine. SPH aims to systematize and facilitate the adoptions of supportive policies, regulations, and standards.

The right capacity refers to developing human capacity to scale up a digital project. Evidence suggests that the great majority of digital projects fail because of inadequate human capacity, not inadequate technology. The 2018 World Development Report consistently highlighted that human capital is positively correlated with the level of technology adoption.[33] Underestimating the importance of human capacity when scaling up a digital health intervention is one of the biggest (and most common) mistakes made by project designers. SPH will ensure that part of the budget of digital projects will be allocated to capacity-building efforts, such as training, workshops, and change management activities.

Finally, SPH commits to reporting on IDB projects with digital health transformation components that are successfully scaled. In the digital health marketplace, SPH will track how many pilots supported by SPH are expanded over time and how many projects are replicated and adapted in a different context.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Design digital health projects for scale from the start
- Invest in enabling factors to design for scale
- Ensure funding for ex post evaluation of IDB projects with digital health transformation components to effectively detect which project might be scaled
- Develop total cost of ownership analyses as part of the cost-benefit analysis of projects
- Ensure that part of the budget of IDB projects with digital health transformation components will be allocated to capacity building

KPIs

- Number of contracts with providers with provisions for scaling up solutions[34]
- Percent of SPH projects with digital health transformation components with ex ante evaluation
- Percent of SPH projects with digital health transformation components with total cost of ownership analysis as part of their cost-benefit analysis

33. World Bank. 2018.
34. Such as price ceilings for scaling up successful pilots.

Address Privacy and Security

PDD definition of this principle: "Addressing privacy and security in digital development involves careful consideration of which data are collected and how data are acquired, used, stored, and shared. Organizations must take measures to minimize data collection from individuals and protect their confidential information and identities in data sets from unauthorized access and manipulation by third parties. Responsible practices for organizations collecting and using individual data include considering the sensitivities around the data they have collected, being transparent about how the data will be collected and used, minimizing the amount of personally identifiable and sensitive information collected, creating and implementing security policies that protect data and uphold individuals' privacy and dignity, and creating an end-of-life policy for post-project data management."

See more at:

https://digitalprinciples.org/principle/address-privacy-security/

SPH application

SPH takes the ethics of collecting and managing data in IDB-funded projects very seriously. Data collection in SPH projects often includes sensitive health data and involves at-risk populations, such as indigenous populations or children. The ethics of proper data collection demands that users are well informed about how and where their data are used and that they can trust project implementers with ensuring that the data will be appropriately protected. SPH will take specific steps to ensure that the information collected is used ethically and stored securely.

Ethical use of information. Basic due diligence for information systems that will collect, store, and/or share information should be able to answer the following questions:

- How much and what kinds of data will be collected?
- What format will they be collected in?
- How frequently will they be collected?
- Who will the data be shared with?
- How will the data be used?
- Will this data be personally identifiable at any point in the data collection or analysis?

This information, along with all other relevant content for informed-consent documents, must be presented to the user in easy-to-understand language. SPH will work with countries to review national policies regarding data protection, in addition to reviewing these questions for specific SPH projects.

Caution must also be exercised when data are fed into algorithms, particularly when those algorithms are used in clinical settings. For example, some EHR systems utilize clinical decision support systems, which include algorithms that suggest a certain diagnosis or medication for a patient by comparing one person's medical information to available training data. However, biased, incomplete, or skewed training data can lead to inaccurate recommendations. In such cases, SPH suggests that a third party conduct an analysis to review the basic structure of the algorithm and identify any potential biases and risks. Whenever algorithms such as clinical decision support systems are included in digital transformation IDB projects, legal liability related to algorithmic errors should be clearly defined in contracts. SPH will continue to collaborate with SCL in the creation and adoption of operational guidelines and safeguards in our projects.

Information security. Data security is another topic that is seldom explicitly discussed when designing health projects—but it should be. Even if all due diligence is performed between the IDB and its clients, that work will be ineffective if sensitive data are breached or otherwise accessed by unauthorized third parties. Health data are valuable and vulnerable, particularly when medical devices permit data to be stored and shared across devices. The proliferation of new access to health data has led to opportunistic data breaches. For example, in 2018, over **6 million people** had their health care data breached.[35]

By including specific language about data protection for users and requiring detailed information on data security in our procurement and contracting documents and risk matrix, SPH will be setting a high standard for project implementers, who will begin to consider data security and privacy as a priority issue for SPH. Moreover, security measures must be regularly verified, as it is very common for vendors to declare high levels of security and still be open to common vulnerabilities. One area sometimes overlooked during project design is how data will be treated after a project is completed. As part of its work in data ethics, SPH will work with governments to review national policies regarding end-of-life data management. As a first step, SPH will ensure that digital projects include privacy and security clauses in contracts and risk matrices.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Ensure that digital projects include privacy and security clauses in contracts and risk matrices
- Ensure monitoring and evaluation funding to verify the security of information systems

KPIs

- Number of projects that have language regarding the need of the informed consent of persons who will provide information
- Number of IDB project contracts that includes language on data privacy
- Number of projects that include funding for security testing of digital solutions as part of the monitoring and evaluation activities

35. Spitzer, J. 2018.

Use Open Standards, Open Data, Open Source, and Open Innovation

PDD definition of this principle: "Too often, scarce public and international development resources are spent investing in new source code, tools, data collection, content, and innovations for sector-specific solutions that are locked away behind licensing fees, with data only used by and available to specific initiatives. An open approach to digital development can help to increase collaboration in the digital development community and avoid duplicating work that has already been done. Programs can maximize their resources—and ultimately their impact—through open standards, open data, open source technologies, and open innovation."

The terms encompassed by this principle are defined as follows on the PDD website:

- *Open standards are publicly available standards with proven implementation success. These standards are developed, adopted and maintained by a community to enable interoperability, or connected systems, across groups and to prevent dependence on any single vendor.*
- *Open data comprise information that can be freely accessed, analyzed and shared, while still maintaining privacy protections. Being open means sharing data with an open license, in a machine-readable format and, preferably, for any purpose (for example, there are no restrictions on the private sector using the data).*
- *Open source is software with source code that anyone can view, copy, modify and share. The open source community prioritizes collective ownership.*
- *Open innovation refers to co-created ideas, concepts and design or to inviting the contribution of ideas (crowdsourcing is one example).*

See more at:

https://digitalprinciples.org/principle/use-open-standards-open-data-open-source-and-open-innovation/

SPH application

SPH sees being open as continuing to be a transparent partner in the region and being intentional about open standards, open data, open source, and open innovation. SPH will support both open and proprietary systems in its projects but will insist on the use of standards for interoperability in all programs we support.

SPH and open standards. SPH will ensure that systems supported by IDB funds adhere to international standards. For example, these may include the use of HL7 (Health Level Seven) for messaging, LOINC (Logical Observation Identifiers Names and Codes) for lab tests, ICDs (implantable cardioverter defibrillators) for diagnostics, and DICOM (digital imaging and communications in medicine) for imaging. These standards will be verified when SPH provides a no-objection to terms of reference. Additionally, SPH will ensure this issue is addressed in countries' national strategies. In a study conducted by RASCEL, only one country of the five included, Uruguay, extensively used international health standards, while Chile, Colombia, Costa Rica, and Peru had low or scarce adoption. Additionally, SPH will continue to support regional work toward the adoption of standards in LAC.

SPH and open data. SPH will continue to adhere to IDB policies on open data and transparency. When appropriate, SPH will include datasets in Numbers for Development, the IDB's open data portal. SPH will also work with governments to improve policies regarding open data and open data portals.

SPH on open source. SPH will continue to support the creation of open source software and ensure it is included in the Code for Development platform. Additionally, SPH will actively work with clients to identify existing solutions created by governments that could be included in Code for Development. SPH will also continue to support the creation of digital health global goods using open source platforms. However, before adopting and using open source solutions in IDB projects, a country must conduct a total cost of ownership analysis and verify its ability to implement the software.

Table 4. An Analysis of the Use of Standards in RASCEL Countries

Item	Colombia	Peru	Costa Rica	Uruguay	Chile
Level of adoption of international standards	Low	Low	Very Low	High	Low
Degree of utilization of Integrating the Healthcare Enterprise (IHE) profiles	Very Low	Very Low	Very Low	Medium	Low
Use of Object Identifiers (OIDs)	Not used	Not used	Not used	Not used	Not used
Current state of country Health Information System (HIS)	Improvable	Improvable	Partially favorable	Partially favorable	Partially favorable
Quality of connectivity	Good	Acceptable	Good	Good	Good
Centers connected to the internet	Most centers	Not most centers	Most centers	All centers	Most centers
Degree of utilization of web services	Medium	Medium	High	High	High

Source: Red Americana de Cooperación de Salud Electrónica (2018).

SPH on open innovation. SPH will continue to harness open innovation platforms to solve complex problems. Kaggle, owned by Google, is one of the world's largest communities of data scientists and machine learners. As one of its offerings, Kaggle hosts competitions where teams can compete to solve problems. The IDB hosted a **competition** over three months, during which we challenged the online community of Kagglers to identify a more accurate method of identifying families who qualify for social programs, and 619 teams submitted code.

By tapping into these kinds of platforms, SPH has the potential to tap into an ever-expanding workforce eager to use its skills and knowledge to make a positive difference in the world.

Figure 8. Screenshot from Kaggle Competition to Harness Open Innovation at IDB

Source: Kaggle (2018).

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Ensure SPH projects require the use of international best standards for interoperability
- Continue to support the development of open source software as a regional public good
- Explore the use of open data portals and their inclusion in national policies with clients
- Include data from health and social protection in IDB Numbers for Development

KPIs

- Number of SPH contributions to IDB's Code for Development
- Percent of SPH-supported projects requiring the use of interoperability standards

Be Data Driven

PDD definition of this principle: "No amount of data will lead to accelerated impact if it is not used to inform decision making. When an initiative is data driven, quality information is available to the right people when they need it, and they are using those data to take action. The data produced by a digital initiative should be used for more than just outputs, such as published works or donor reporting. Examples of the types of data that can be collected to inform decision making include surveillance, research, operations, project management, and data from secondary sources collected outside of the program."

See more at:

https://digitalprinciples.org/principle/be-data-driven/

SPH application

We strive to be data driven in our approach to development and will continue these practices in our digital transformation strategy. SPH will implement this principle in three ways: 1) be data driven in its internal digital transformation strategy by reporting on progress of the KPIs outlined in this document; 2) include indicators in project results frameworks and funding to assess adoption, effectiveness, and cost-effectiveness of digital solutions implemented in our pipeline; and 3) ensure that projects that include digital transformation components develop and implement information management and use strategies.

SPH will provide internal updates on strategy progress every semester. Based on our findings, we will update our strategy accordingly every year through our digital transformation focal points. We will encourage an open culture to discuss what is going well and what needs improvement to allow for continuous course correction.

In our projects, we will verify that projects with digital transformation components have included funding to evaluate effectiveness and cost-effectiveness to contribute to the digital health learning agenda. We will also ensure that project results frameworks have SMART (specific, measurable, achievable, reasonable, and time-bound) indicators to measure technology adoption.

All these changes must be accompanied by behavioral change processes. The availability of data in and of itself does not automatically lead to changes in the ways programs, organizations, and governments structure and monitor their projects. For that reason, SPH will build a data culture by ensuring that projects with digital transformation components develop and implement strategies for information management and usage. Training and capacity building must accompany any investment into new health IT rather than being an afterthought in designing emerging technologies.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Be data driven in the internal digital transformation strategy and reporting on progress of KPIs
- Include indicators in the project results framework and funding to assess adoption, effectiveness, and cost-effectiveness of digital solutions implemented in our pipeline
- Support operational research on how to implement digital transformation (DT) solutions
- Ensure that projects that include digital transformation components develop and implement information management and use strategies

KPIs

- Number of reports on SPH progress shared internally
- Number of SPH DT projects in pipeline with funding allocated for cost-effectiveness/effectiveness studies
- Number of SPH DT projects in pipeline with technology adoption indicators in the results framework

Build for Sustainability

PPD Definition: "Building sustainable programs, platforms, and digital tools is essential to maintaining user and stakeholder support as well as maximizing long-term impact. Sustainability ensures that user and stakeholder contributions are not minimized as a result of interruptions, such as a loss of funding, and a program built for sustainability is more likely to be embedded into policies, daily practices, and user workflows. For many digital initiatives, institutionalization by an NGO, private company, or local government is the ultimate goal in achieving a long-term, positive impact. For others, institutionalization is achieved by developing a business model that has sustainable revenue generation."

See more at:

https://digitalprinciples.org/principle/be-data-driven/

SPH application

For SPH, sustainability means that solutions are flexible and can grow as needed, countries can support the total cost of ownership of their solutions, and local capacity is developed for digital transformation. It also means that the appropriate policies and enabling factors are in place. SPH will not support project-specific or vertical, stand-alone systems. If investments are made in a specific project area, SPH will ensure that the technological tool or system is designed to potentially expand and include new topics in the future. Examples include using a modular approach to software development or investing in platforms that allow for expansion and updates based on new content areas. In addition, solution providers will be vetted for sustainable business models, and operations will include sustainability and scaling plans as part of their program design.

SPH is also aware that many vendors for the region are not based within the region, so long-term sustainability will mean that countries build local expertise and that local vendors become available. SPH will develop a sustainability and innovation framework for investments, working with regional networks to improve local capacity through training and knowledge exchange in health informatics and working with governments to develop long-term human resource capacity-building plans.

SPH's actions and KPIs: For this principle, these are the main actions to be taken and the indicators to measure performance of the implementation.

Actions

- Avoid bespoke systems and conduct market research to better understand existing commercial off-the-shelf and free software before deciding to design customized systems
- Approach system design with a platform mindset and modular design, as opposed to digitizing silos
- Calculate total cost of ownership up front and include a sustainability plan in investments
- Support regional networks to improve local capacity through training and knowledge exchange in health informatics

KPIs

- Number of operations with sustainability and scale plans created as part of their design
- Number of solutions with total cost of ownership calculated prior to implementation
- Number of programs with long-term human resource capacity-building planning included
- Number of people trained in health informatics

Conclusion

IDB's endorsement of the PDD sends signals within and outside of the institution about our continued commitment to supporting LAC's digital transformation.

SPH believes that to be a successful partner, we must mirror successful digital solutions by iteratively evolving and adapting to changing needs and circumstances. This document outlines how we can begin to embody these principles in our day-to-day processes and procedures.

IDB's Social Sector is committed to exploring the potential of new technologies as well as responsibly establishing adequate processes and safeguards to avoid unnecessary risks. SPH has defined a series of tasks to guide our investments in digital transformation using the PDD, endorsed by the IDB as a framework. Actions related to the nine principles include due diligence before and during project design, such as required diagnostics and consultations with stakeholders to guarantee strong institutional backing. We will also ensure that safeguards are included to guarantee that ethical principles and security standards will protect access to and use of sensitive data. In addition, we will promote design features that will increase the effectiveness and sustainability of investments, such as user-centered design, investments in change management, and realistic costing of implementation and maintenance of new interventions.

Following these nine guidelines also means adopting procurement and contractual best practices for digital interventions, such as the use of agile me-thods and clauses to avoid the negative consequences of vendor lock-in and promote making investments reusable. Doing so will enable the IDB to contribute to efforts already in place while avoiding duplication and confusion for our development partners.

We expect our actions and KPIs to evolve over time and will update our strategy as required. Some of the actions included in this document will be supported by additional internal guidelines and through partnerships with other institutions. SPH will report throughout the year on progress in implementing the actions described in this document and make necessary adjustments based on lessons learned. By implementing these principles, SPH hopes to more effectively assist government partners with implementing digital interventions that improve the health and social protection of beneficiaries in LAC.

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Annex

Examples of Successful Pilot implementations of Open Source Software Systems Supported by SPH

CCVMS: Sistema para la administración de la red de frío y vacunación

The CCVMS is used specifically to manage the cold chain and vaccinations. For the cold chain, the CCVMS monitors and manages inventory (cold storage, refrigerators, thermostats, spare parts), the status of the chain in real time, manual and automatic temperatures, and a mobile and online maintenance report. For vaccinations, the CCVMS maintains census records as well as a biological registry, a data registry, statistics of schemes, and analyses of needs. Use the QR code to visit IDB Code for Development for the source code and to learn more.

CIUM: Capture of Indicators in Medical Units, Chiapas

This tool simplified and updated the previous processes of capturing indicators that existed in Excel and involved manual data entry. The CIUM includes data entry through an Android application and has automatic synchronization with internet access as well as automatic processing. The indicators capture resources and quality of care. Use the QR code to visit IDB Code for Development for the source code and to learn more.

CQI: Continuous Quality Improvement App for Teams and Supervisors, Regional

This app allows teams and supervisors to collect information from chart audits or direct observation of equipment and drugs for CQI activities. The scores are calculated offline for use in the field. Content currently includes international standards for reproductive, maternal, neonatal, and child health, which were created and validated in eight countries as part of IDB's Salud Mesoamerican Initiative. The app is currently used in Belize and will soon be used in Honduras. Download CommCare from Google Play, an open source software platform created by Diamgi, and scan the QR to access the demo version of the app: Demo / 123.

eTAB: Integrated Information Management System, Regional

eTAB is an open source business intelligence tool created through a collaboration between the ministries of health in Central America with the support of IDB's Salud Mesoamerica Initiative. First developed in El Salvador, the system was then modified and replicated in Belize, Chiapas, Costa Rica and Guatemala. This tool allows countries to easily see and share data to monitor performance from their routine HIS, from national averages to individual health center performance. eTAB is important to national and local actors in the health system, as it provides access to information for decision making. It is also important to international organizations, as countries can use this system to report on program progress without additional effort.

GEOMINSAL: Geographic Information System, El Salvador

This open source geographic information system was created by the Department of Technology of the Ministry of Health of El Salvador. GEOMINSAL includes information on the location of health centers and hospitals, disease prevalence, and suspected cases of vector-borne illnesses.

SGiS: System for the Management of Incidents in Health

This system, created by Chiapas, tracks the admission, follow-up, referral, and discharge of the patient as well as the resources and supplies necessary for these processes within the medical facility. Use the QR code to visit IDB Code for Development for the source code and to learn more.

SIAP: Information System for Patient Care, El Salvador

SIAP is a distributed electronic medical record application that works on a server located in each health facility. The system is modular and web-oriented and currently operates in establishments of all levels of care that are interconnected through a data network. It includes administration and discharge, laboratory, imaging, and pharmacy modules. Use the QR code to access the MINSAL's Gitlab to access the source code.

SIFF: Family Information System, El Salvador

This open source application was created by the Department of Technology of the Ministry of Health of El Salvador. SIFF (for its Spanish name, Sistema de Information de la Ficha Familiar), is a tool used by primary health teams for collecting and updating data corresponding to social and health determinants of families to manage information at the individual, family, and population levels. It also collects geographical information for creating risk maps. Use the QR code to visit MINSAL's Gitlab to access the source code.

ttC: Timed and Targeted Counseling App for Community Health Workers

This app is designed for timed and targeted counseling for community health workers, whom the app walks through an entire home visit. ttC also includes songs and videos related to reproductive, maternal, neonatal, and child health. The app was used in Honduras for two years as part of a pilot program in conjunction with IDB's Salud Mesoamerica Initiative. Download CommCare from Google Play, an open source software platform created by Dimagi, and scan the QR to access the demo version of the app.

Social Protection and Health Division's

Approach to Digital Transformation: Guidelines and Recommendations