An Introduction to Digital Square Global Goods

"Governments around the world are embracing this new age of digital health transformation. Expectations are high as more governments look towards these new tools and the connections they create."

Dr. Mpoki Ulisubisya, Permanent Secretary
Tanzania Ministry of Health, Community Development, Gender, Elderly and Children

OpenHIE Community Meeting, July 2018

Digital health promises a future with more responsive, participatory health care—but only for those who can access it.

Governments need quality, affordable digital health technologies that work for all communities.

The future of digital health relies on better alignment among country leaders, investors, and innovators.

Historically, digital health initiatives have addressed the health system through a narrow lens.
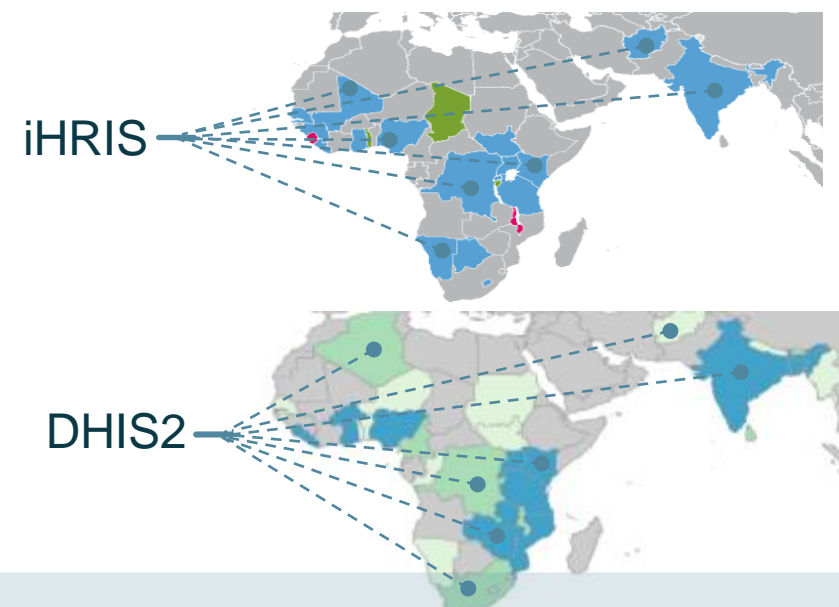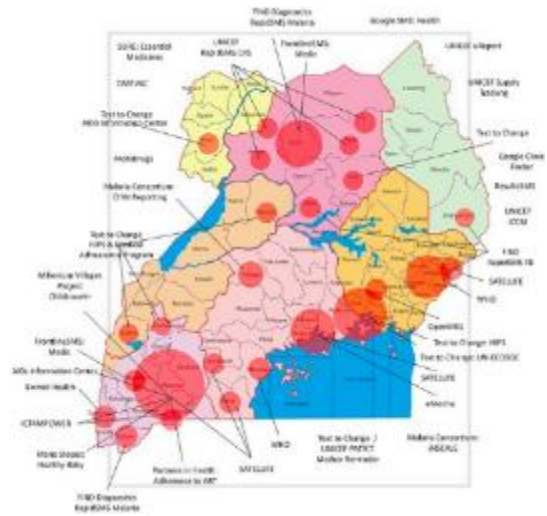
Many Pilots

Global Goods

iHRIS

DHIS2

The proliferation of digital health stakeholders and projects has led to fragmentation, competing priorities, and additional burdens on the health system.

# Digital Square was created to address the need for alignment and coordination in the digital health sector.

"Create funding mechanisms and models that enable co-funding and both build and sustain digital health commons."

USAID–Fighting Ebola with Information, 2016

"Support interoperability of digital technologies for health by...the use of international and open standards as an affordable, effective and easily adaptable solution."

WHO Resolution 2017–A71/A/CONF./1
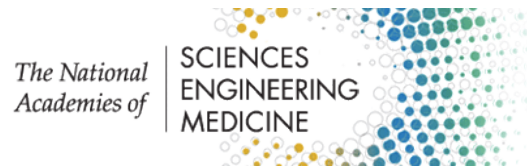
"Transition investments towards global public goods that build national health systems."

National Academies of Science, Engineering, and Medicine, May 2017

"Ecosystem collaboration is needed to address current fragmentation and create a holistic digital health model."

GSMA–Scaling Digital Health in Developing Markets, June 2017

Digital Square has identified **three barriers** where it can have the most influence:

1. Inadequate alignment of actors pursuing the digital transformation of health, leading to large inefficiencies in digital health investments.

2. Inadequate investment into scaling digital health innovations beyond the pilot stage, and maturing them into global goods, resulting in loss of trust from countries when pilots are unable to replicate small-scale successes at scale.

3. Country health leader demands for information, knowledge, and skills are not being met, and information asymmetries lead to misalignment around national digital health strategies.

Vision

A world where appropriate use of digitally enabled health services closes the health equity gap.

Mission

Connect health leaders with the resources necessary for digital transformation

Digital Square addresses the need for a thriving marketplace for digital health.

Alignment & Co-investment

Global Goods
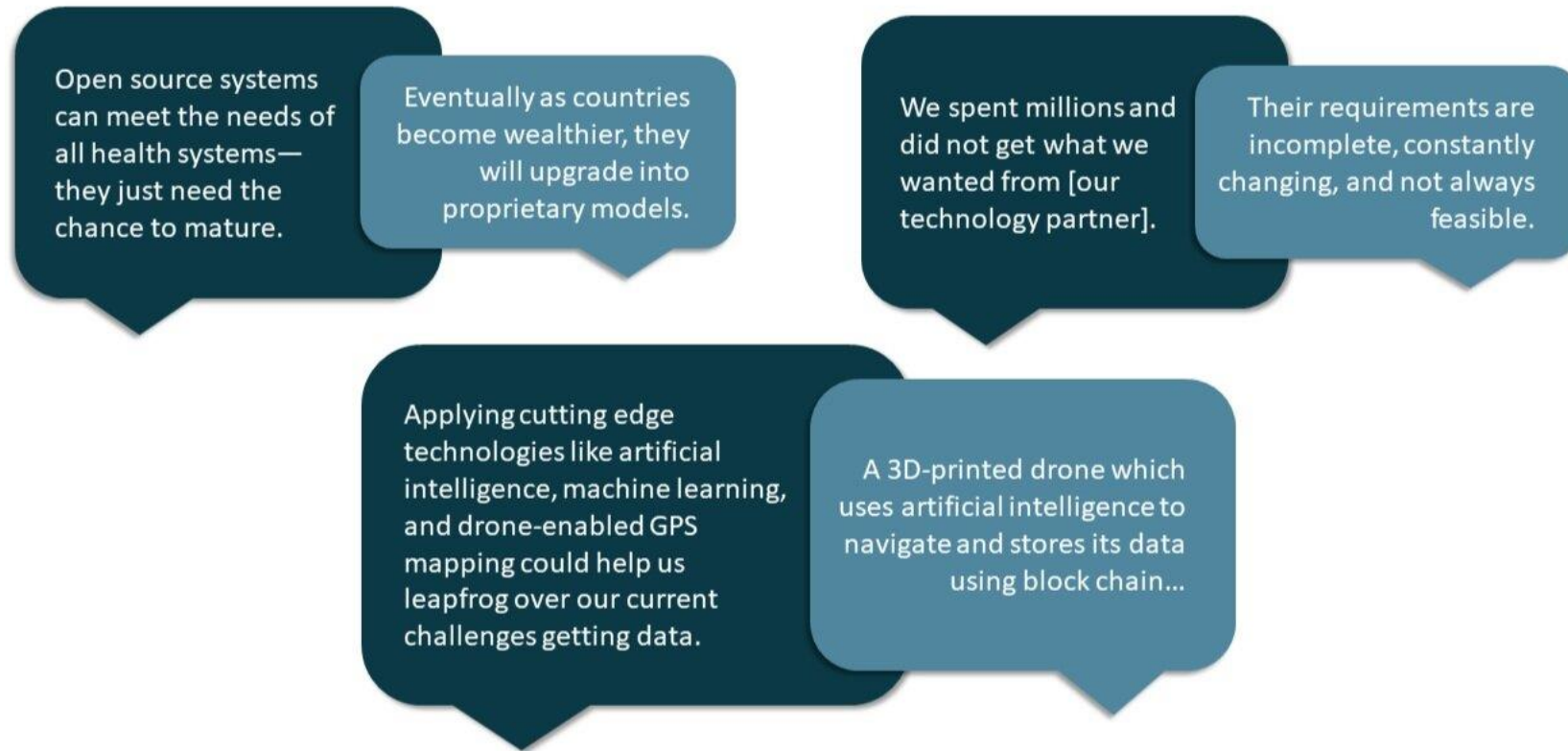
Regional & Country Systems

Alignment & Co-Investment

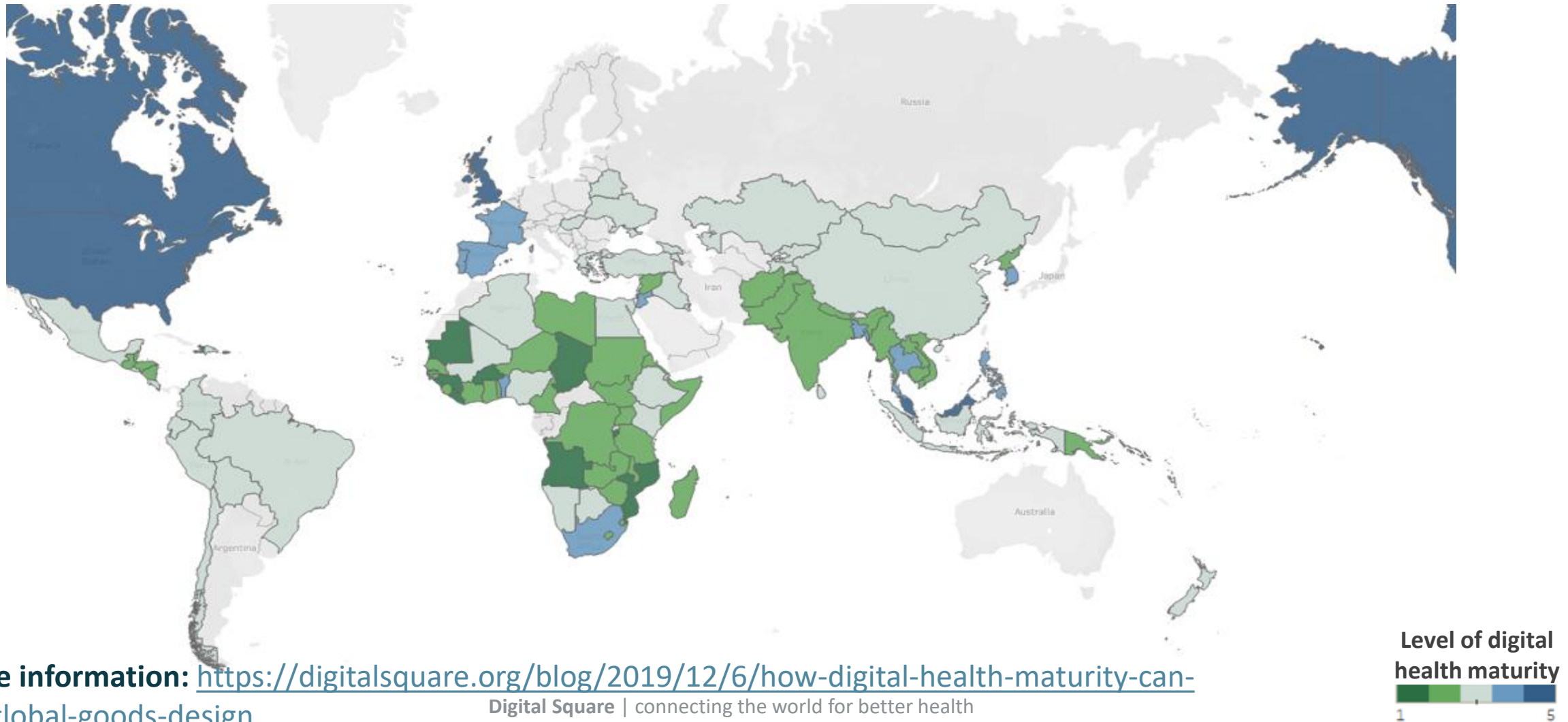**Alignment & Co-investment**

Digital Square:

- Supports a shared vision.

- Grows the overall digital health sector.

- Provides an agile procurement vehicle.

- De-risks investment into digital health by making high-impact opportunities visible.

Flagship initiative: Assessing how digital health maturity varies throughout the world

Open source systems can meet the needs of all health systems— they just need the chance to mature.

Eventually as countries become wealthier, they will upgrade into proprietary models.

We spent millions and did not get what we wanted from [our technology partner].

Their requirements are incomplete, constantly changing, and not always feasible.

Applying cutting edge technologies like artificial intelligence, machine learning, and drone-enabled GPS mapping could help us leapfrog over our current challenges getting data.

A 3D-printed drone which uses artificial intelligence to navigate and stores its data using block chain…

For more information: https://digitalsquare.org/blog/2019/12/6/how-digital-health-maturity-can-inform-global-goods-design

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Level of digital health maturity

1   5

Flagship initiative: Assessing how digital health maturity varies throughout the world

Level of digital health maturity

1 — 5

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Flagship initiative: Digital health market analytics can build alignment on what's important at different levels of maturity

Level 1 (Least mature countries)	Level 2	Level 3	Level 4	Level 5 (Most mature countries)
			HIPAA/GDPR	
			Health insurance workflows	
			Artificial intelligence / machine learning*	
			De-duplication	
			UI/UX	
		High number records allowable		
		Cloud-based		
Open source				
Automation*				
Offline functionality				
Small data packets				
SMS inputs				
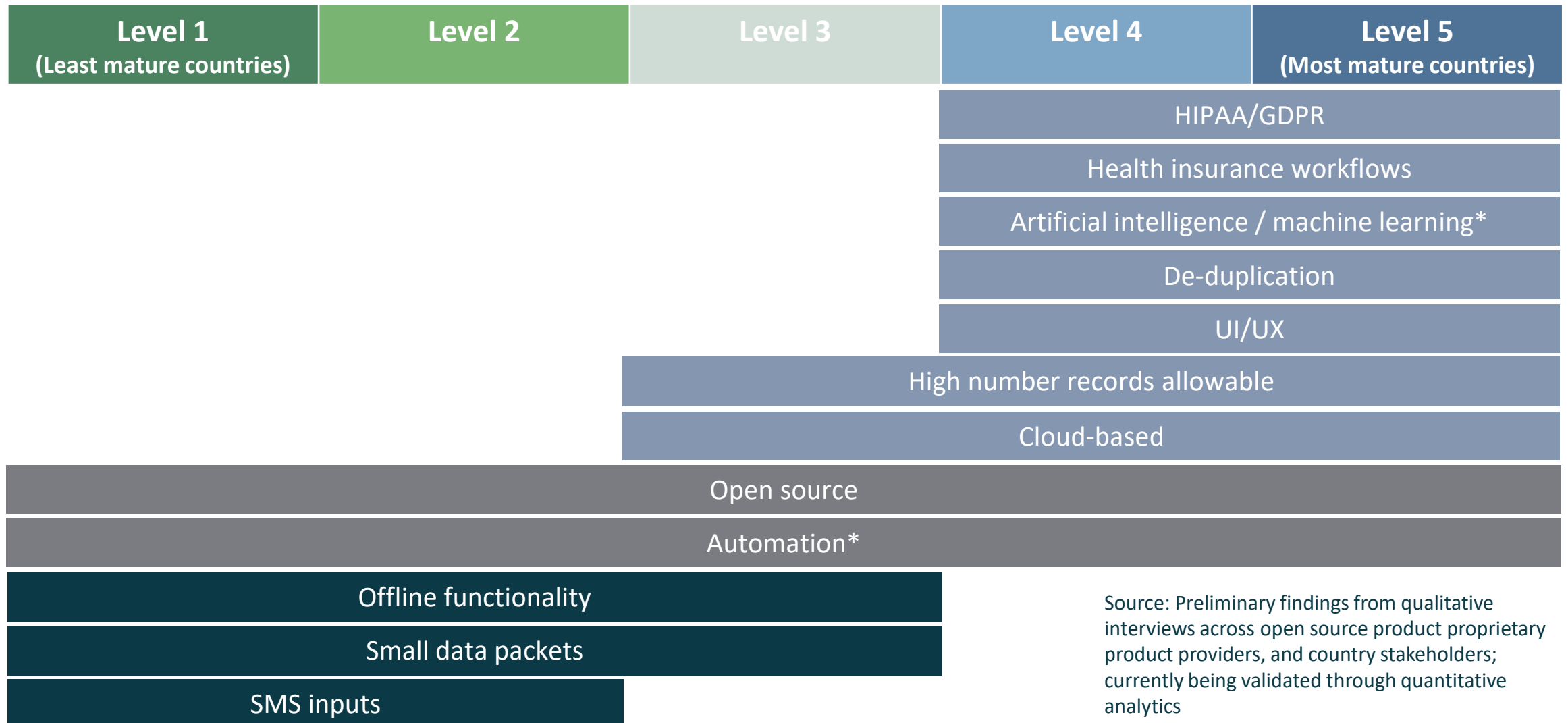
Source: Preliminary findings from qualitative interviews across open source product proprietary product providers, and country stakeholders; currently being validated through quantitative analytics

Global Goods

Global Goods

Digital Square:

- Allocates global good investments transparently and with community input.

- Provides rigorous yet pragmatic technical oversight on investments.

- Connects the global good community to each other and to country efforts.

- Secures investment for core software development.

Digital Health Global Goods

Global goods are digital health tools that are adaptable to different countries and contexts. There are three types of global goods:

Software

A software tool that is (frequently) free, open source, and used to manage, analyze, or transmit health-related data, with proven utility in several settings.

Services

A software tool that is used to manage, transmit, or analyze health-related data that can be freely accessed as a software service and adheres to open data principles.

Content

A resource, toolkit, or data standard that is available under an open license and that is used to improve or analyze health data management processes.

For more information: https://wiki.digitalsquare.io/index.php/Main_Page

Specific examples of global goods

Open source, web-based Health Management Information System (HMIS) platform. Since DHIS2's release in 2006, nongovernmental organizations (NGOs) and national governments have deployed DHIS2 for health-related projects, including monitoring patient health, improving disease surveillance and pinpointing outbreaks, and speeding up health data access.

Open source, cloud-based electronic logistics management information system (LMIS) purpose-built to manage health commodity supply chains.
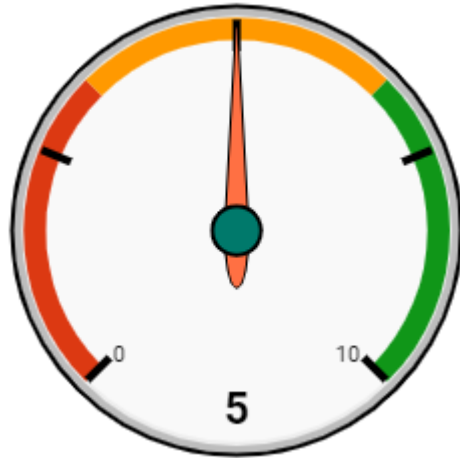
Software platform and a reference application which enables design of a customized medical records system with no programming knowledge.

Mobile data collection tools for resource-limited settings

For more information: https://digitalsquare.org/resourcesrepository/global-goods-guidebook

Global Good Maturity Model

Software Maturity

- Security
- Scalability
- Software productization
- Technical documentation
- Interoperability and data accessibility
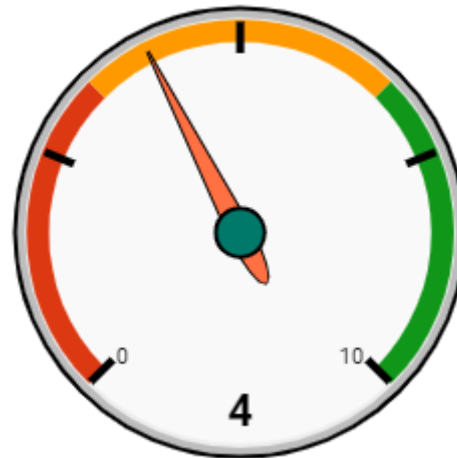
Global Utility

- Country utilization
- Country strategy
- Digital health interventions
- Source code accessibility
- Funding and revenue
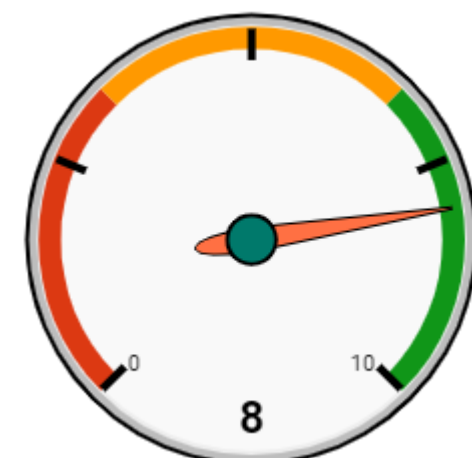
Community Support

- Community engagement
- Community governance
- Software roadmap
- User documentation
- Multilingual support

Global utility/Country utilization: Preliminary market penetration analysis of 10 Digital Square global goods

Number of global goods deployed

- 1
- 2
- 3 or more

Global Utility/DHI: Digital Square approved global goods aligned with primary WHO Classifications

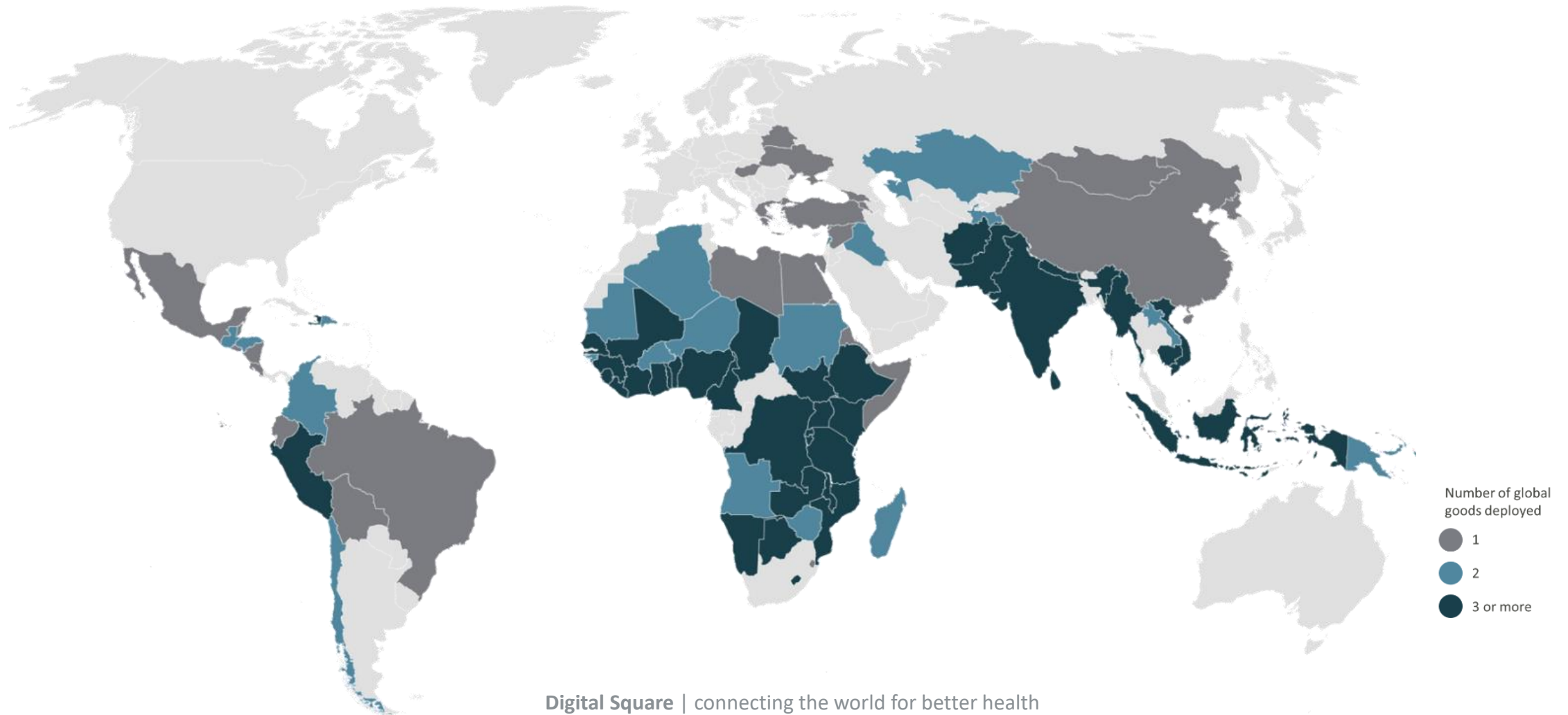| Public Health Disease Surveillance System	Electronic Medical Records	Laboratory Diagnostics Information System	Telemedicine	Data Interchange, Interoperability and Accessibility	Facility Management Information System	Research Information Systems
SORMAS **mHero*** **ODK-X** *REVEAL*	**Bahmni*** **OpenMRS*** **OpenSRP**	**LIS COP*** **OpenELIS*** *Child Growth Monitor*	*Mobile WACh*	**OpenHIE*** **OpenHIM***	**GOFR*** **Healthsites***	**SORMAS** **mHero*** **ODK-X** *REVEAL*

Health Management Information System	Logistics Management Information System	Civil Registration and Vital Statistics	Clinical Terminology and Classifications	Community-based Information System	Geographic Information System
DHIS2* *OpenCHS*	**OpenLMIS*** *Logistimo*	**OpenCRVS***	**Open Concept Lab***	**CommCare*** *Community Health Toolkit*	*Planwise*

Health Finance and Insurance Information System	Human Resource Information System	Knowledge Management System	Pharmacy Information System	Shared Health Record and Health Info. Repositories	Learning and Training System
OpenIMIS*	**iHRIS***	**Digital Health Atlas** **KM Library (using dspace)**	*Pharmadex*	**HAPI FHIR*** *HEARTH*	*OpenDeliver*

Identification Registries & Directories	Census, Population Information & Data Warehouse	Client Applications	Client Communication Systems	Emergency Response System	Environmental Monitoring System
PCMT*					

Legend	
Bold	Funded
Italicized	Unfunded
*	Aligned with OpenHIE

Global Utility/DHI: Number of global good investment systems covering DHI Classification areas

1.0 CLIENTS

1.1	Targeted Client Communication (1)	3
1.2	Untargeted Client Communication	1
1.3	Client to Client Communication	0
1.4	Personal Health Tracking	1
1.5	Citizen-based Reporting	4
1.6	On-demand information services to clients	3
1.7	Client financial transactions	2

2.0 HEALTHCARE PROVIDERS

2.1	Client identification and registration	10
2.2	Client Health Records	12
2.3	Healthcare provider decision support	11
2.4	Telemedicine	4
2.5	Healthcare provider communication	7
2.6	Referral coordination	10
2.7	Health worker activity planning & scheduling	7
2.8	Healthcare provider training	4
2.9	Prescription and medication management	3
2.10	Laboratory and Imaging Management Diagnostics	5

3.0 HEALTH SYSTEM MANAGERS

3.1	Human Resource Management	4
3.2	Supply Chain Management	7
3.3	Public Health Event Notification	2
3.4	Civil Registration and Vital Statistics	1
3.5	Health Financing	1
3.6	Equipment and Asset Management	6
3.7	Facility Management	6

4.0 DATA SERVICES

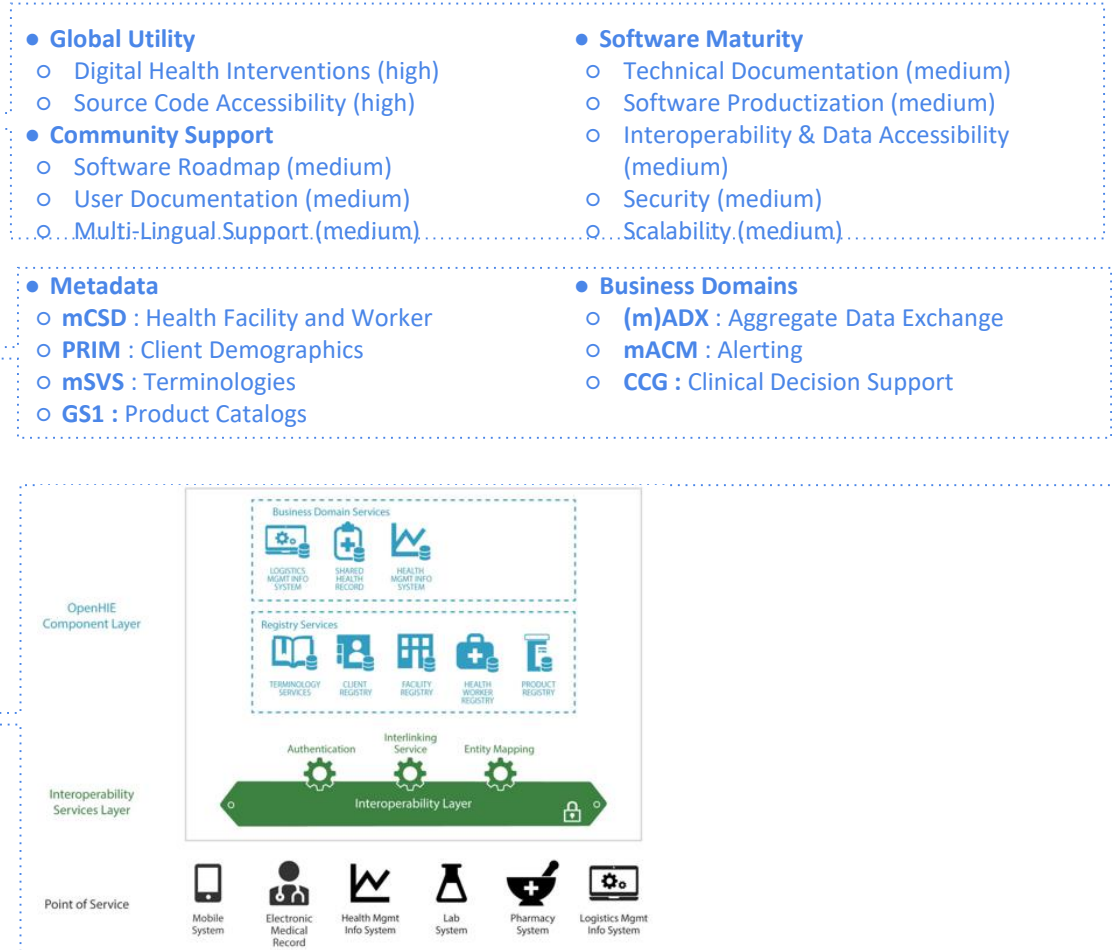|		
4.1	Data Collection, Management and Use (9)	16
4.2	Data Coding (1)	4
4.3	Location Mapping (6)	8
4.4	Data Exchange and Interoperability (4)	13

Legend

- *Shaded (#):* Global goods supported by Digital Square (approved by Digital Square Board)
- *White:* Not currently supported by Digital Square

Software Maturity/Productization: Evolving to shelf readiness

Business Domain Services

Logistics Mgmt Info System · Shared Health Record · Health Mgmt Info System

Registry Services

Terminology Services · Client Registry · Facility Registry · Health Worker Registry · Product Registry

OpenHIE Component Layer

Authentication · Interlinking Service · Entity Mapping

Interoperability Services Layer

Interoperability Layer

Point of Service

Mobile System · Electronic Medical Record · Health Mgmt Info System · Lab System · Pharmacy System · Logistics Mgmt Info System

Business Domain Services

Shared Health Record	Health Mgmt Information System	Health Insurance Mgmt System	Supply Chain Management	....	...	...
HAPI	DHIS2	openIMIS	OpenLMIS			

Metadata Registries + Interoperability Layer

Client Registry	Facility Registry	Terminology Service	Health Worker Registry	Product Registry	Indicator Registry	Interop Layer
OSCR	GOFR + TBD	Open Concept Lab	IHRIS	PCMT	OCL + HAPI	OpenHIM

Point of Service Systems

Electronic Medical Records	Hospital Mgmt System	Community Health Worker Tools	Disease Surveillance Tools	Immunization Registry	....	...
OpenMRS	Bahmni	CommCare, DHIS2 Tracker, Medic Mobile	SORMAS	ZeIR, TimR, DHIS2 Tracker - IR		

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Software Maturity/Productization: Shelf-ready requirements: Phase I

- Required score according to <u>Global Good Maturity Model</u>

- Supports standards for data exchange as appropriate

- Aligns with <u>DevOps & Cloud-Services</u> guidelines

- Aligns with <u>OpenHIE Architecture</u> (Instant OpenHIE)

- Prioritize those with entry in <u>Global Good Guidebook</u>

- **Global Utility**
  - Digital Health Interventions (high)
  - Source Code Accessibility (high)
- **Community Support**
  - Software Roadmap (medium)
  - User Documentation (medium)
  - Multi-Lingual Support (medium)

- **Software Maturity**
  - Technical Documentation (medium)
  - Software Productization (medium)
  - Interoperability & Data Accessibility (medium)
  - Security (medium)
  - Scalability (medium)

- **Metadata**
  - **mCSD** : Health Facility and Worker
  - **PRIM** : Client Demographics
  - **mSVS** : Terminologies
  - **GS1 :** Product Catalogs

- **Business Domains**
  - **(m)ADX** : Aggregate Data Exchange
  - **mACM** : Alerting
  - **CCG :** Clinical Decision Support

Software Maturity/Productization: Shelf ready requirements Phase II

- Build off Phase I (productization) requirements

- Identify Functional Requirements for each of the "shelves" (business domain services, metatadata registries & interoperability layer, point of service systems)

- Example-EMRs and Digital Client Records should draw functional requirements from:
  - HL7 EMR Functional Requirements
  - Digital Accelerator Kits
  - OpenHIE identified workflows (e.g. Registration as a Service, Referrals)

- Example-Health Insurance should draw requirements from:
  - Joint Learning Network's "Search Results Connecting Health Information Systems for Better Health"
  - OpenHIE Health Financing community identified workflows

Open Application Process

Periodically, Digital Square holds a "open call for applications," whereby organizations can submit concept notes for new global goods investments using an Open Application Process.

Open Submission of Concept Notes

Proposal Co-creation & Collaborative Feedback
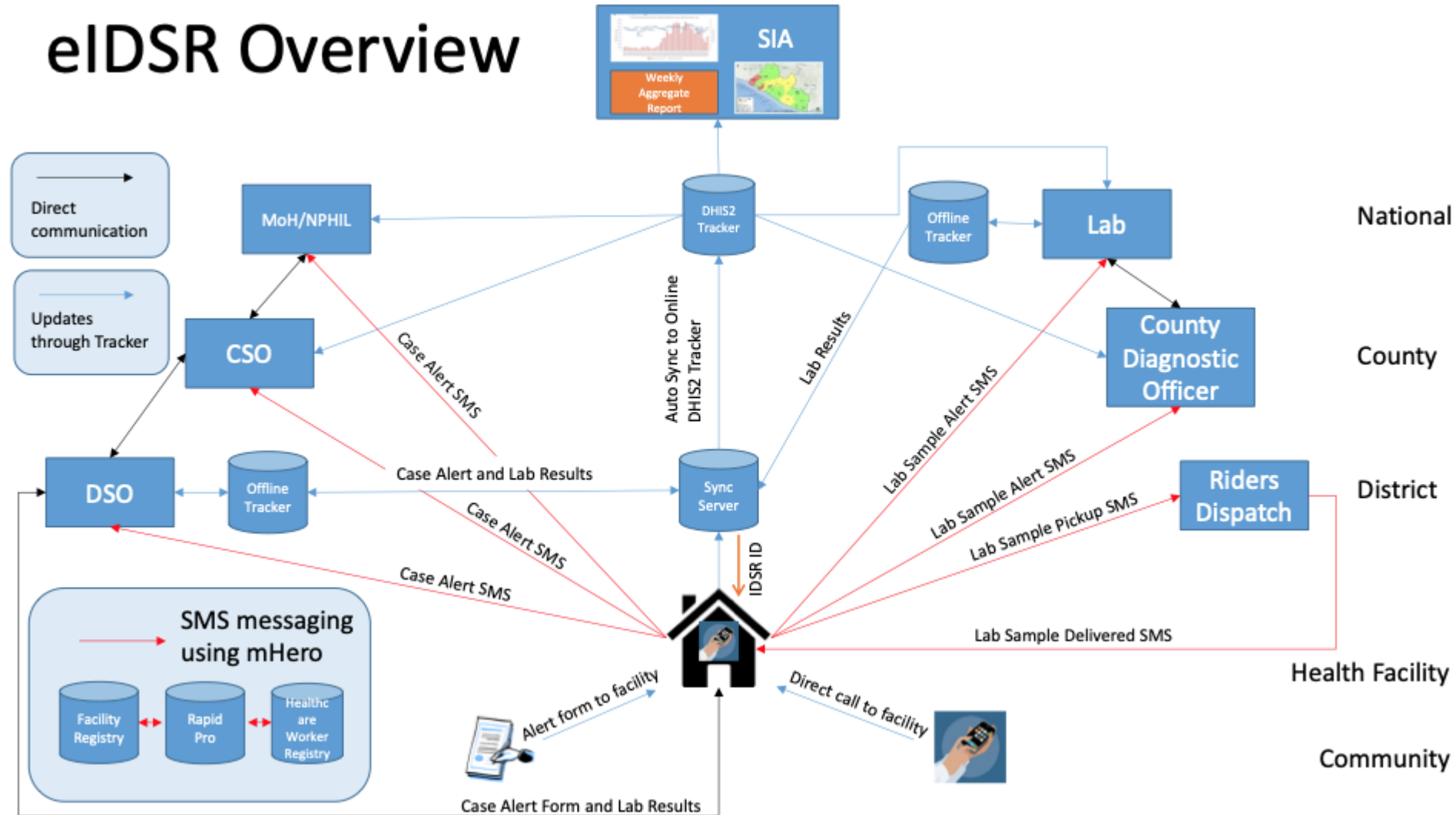
Final Proposal & Budget Submission

Vetted by Peer Review Committee

Funding Decisions by Board

COVID-19: Select overview of identified needs for digital systems

Regional/Global	Inputs to WHO SitRep	Regional Case Reporting & Surveillance	Cross-Border Contact Tracing	Push out new policies and guidance
National/ MOH	Dashboards for Emergency Operations Centers	Lab Results & Specimen Transport	HW Comms & Coordination	Distribution PPEs and Reagents
Sub-national	Dashboards for Surveillance Officers			Remote Training
Health facility/ Community	Data-driven action lists (e.g. contact tracing, case reporting)		Stock levels PPEs and Reagents	

COVID19: Liberia's electronic integrated disease surveillance & response system(s)

Global Good	Adaptation
dhis2	• Ready-to-install DHIS2 digital data packages to support COVID-19 surveillance & response based on WHO guidelines. Optimized for Android or web-based data collection. • 1) case-based surveillance to track a case through clinical examination, exposures, initiate lab requests, record lab results and case outcome; 2) contact tracing program to facilitate operations of contact tracing and with built in relationships to the case-based tracker for enhanced analysis; 3) automated analysis of core indicators & dashboards for response planning.

OpenLMIS	•OpenLMIS is responding by supporting OpenLMIS countries to optimize their use of the software to encourage good supply chain management of COVID supplies. We are currently conducting country outreach to ensure users know how to quickly:
	    • Add new Products
	    • Initiate emergency requisitions
	    • Configure and manage inventory of Kits (anticipating the need for COVID kits)

OpenMRS	The following OpenMRS COVID-19 Public Health Response Tools under development and discussion include:
	    • CIEL concept dictionary with COVID-19 concepts
	    • COVID-19 Public Health Response Module
	    • COVID-19 Public Health Reporting System Interfaces
	•Standard content related to COVID-19 included in the recent release of Reference Application 2.10.0.

OPEN DATA KIT	•ODK's lead developer, Nafundi, is offering pro-bono help to anyone working on the COVID-19 response. •Rapidly digitizing forms from the WHO and CDC protocols and making them available for others to use and build on. •Offering support for ODK for contact tracing, decision support, community education, strategic mapping, and case management.
OpenHIE COVID-19 Task Force (Cross-cutting for all global goods)	•Identify and collate information relating to data standards and exchange relevant to the COVID-19 response. •Identify gaps in and establish standards for data exchange priorities. •Provide documentation and guidance (to both the global good community as well as proprietary software tools) to improve adherence to these standards. •Ensure that rapidly deployed solutions can be integrated into the national digital health architectures. •Outputs: HL7 FHIR profile / implementation guide for case reporting & contact tracing.

More information here: https://wiki.digitalsquare.io/index.php/Main_Page#Global_Good_Adaptations_to_COVID-19_.28updated_May_4.2C_2020.29

Regional & Country Systems

Digital Square:

- Coordinates resources and expertise from multiple investors to support country and regional digital health initiatives.

- Supports the professional development of local global good entrepreneurs and link them to the global good community.

Flagship Initiative: The Digital Health Applied Leadership Program

Teams of learners from 10-12 countries enroll in the DHALP

Learners work with managers to set goals prior to starting DHALP

Coaches support groups of 6-8 learners throughout the program

Core courses & workshops for all learners

Elective courses: learners pursue options based on their learning objectives

Digital health networks support learners throughout the program

Global network of digital health leaders and strong country governance

Digital Health Leadership Practitioner Certification

As of 5/1/20, Digital Square has catalyzed
$48,672,715

13
investors

2
co-investors

26
global goods

4
country buy-ins

40+
partners

250+
DH&I WG members

$12m
invested in global goods

4
regional networks

connecting the world
for better health

✉ **digitalsquare@path.org**   🌐 **www.digitalsquare.org**
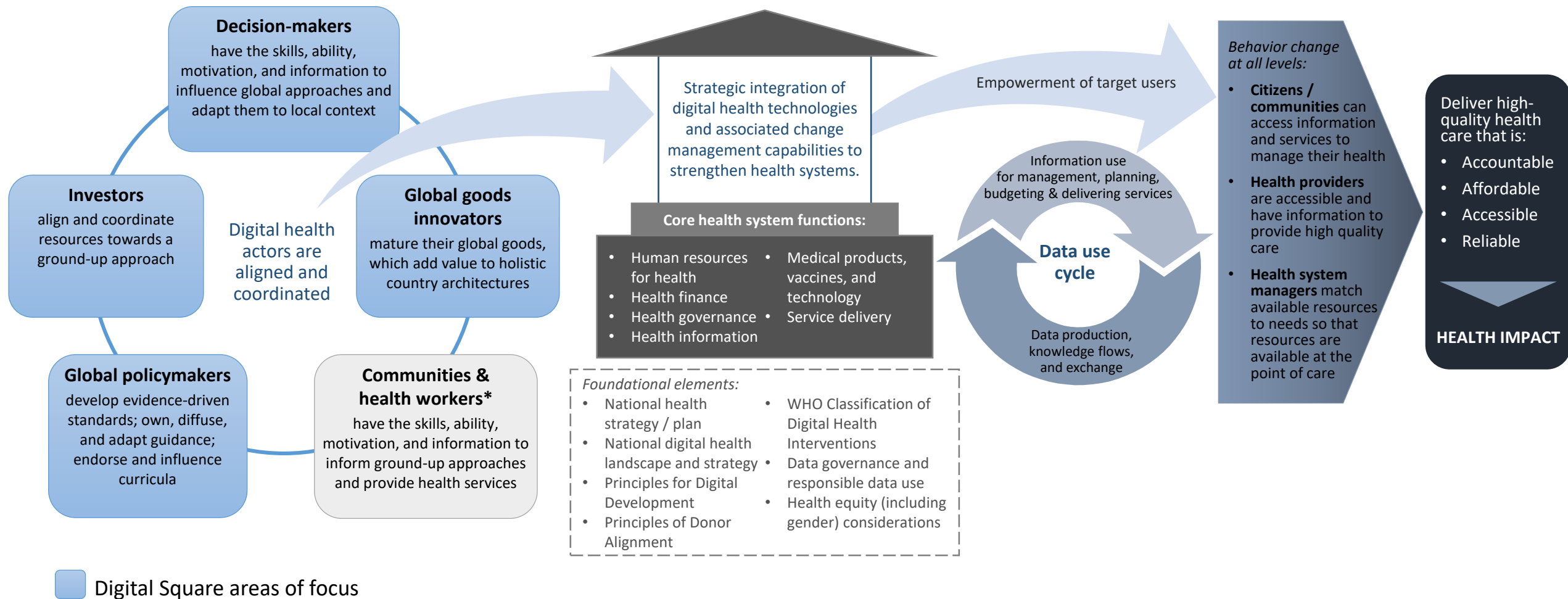
Appendix

Alignment among digital health actors can catalyze digital transformation.

Digital transformation can strengthen the health system by improving the data use cycle and empowering target users…

…which can accelerate outcomes at all levels to drive toward high-quality health care and health impact.

Decision-makers have the skills, ability, motivation, and information to influence global approaches and adapt them to local context

Investors align and coordinate resources towards a ground-up approach

Global goods innovators mature their global goods, which add value to holistic country architectures

Digital health actors are aligned and coordinated

Global policymakers develop evidence-driven standards; own, diffuse, and adapt guidance; endorse and influence curricula

Communities & health workers* have the skills, ability, motivation, and information to inform ground-up approaches and provide health services

Strategic integration of digital health technologies and associated change management capabilities to strengthen health systems.

Core health system functions:
- Human resources for health
- Health finance
- Health governance
- Health information
- Medical products, vaccines, and technology
- Service delivery

Foundational elements:
- National health strategy / plan
- National digital health landscape and strategy
- Principles for Digital Development
- Principles of Donor Alignment
- WHO Classification of Digital Health Interventions
- Data governance and responsible data use
- Health equity (including gender) considerations

Empowerment of target users

Information use for management, planning, budgeting & delivering services

Data use cycle

Data production, knowledge flows, and exchange

Behavior change at all levels:
- **Citizens / communities** can access information and services to manage their health
- **Health providers** are accessible and have information to provide high quality care
- **Health system managers** match available resources to needs so that resources are available at the point of care

Deliver high-quality health care that is:
- Accountable
- Affordable
- Accessible
- Reliable

HEALTH IMPACT

Digital Square areas of focus

Contextual factors: health equity (including gender), global initiatives, civil/political unrest, disease outbreaks, socioeconomic status, natural disasters, privatization, decentralization, etc.

Alignment & Co-Investment: Success

2020 Target	2020 Stretch Goal	Long-term goal

• Increased alignment on:
    • WHO and Digital Square strategies
    • Country leadership
    • The role of digital in COVID-19 response and in provision of essential services
• Two new investors and two renewing investors.
• $15M in financing secured.
	• Increased alignment on:
	    • Theory of Change
	    • Curriculum harmonization
	    • Value of market analytics
	• Double number of investors coordinate and align with Digital Square compared to 2019.
	• $30M in financing secured.
		• Increased alignment on how to create a self-sustaining market for digital health interventions in low-resource settings.
		• 75% of signatories to the Donor Alignment Principles invest in Digital Square.
		• $1B secured for entire sector, with ~$200M/year running through Digital Square.

Priority learning questions:

- How much financial capital is needed to support a thriving digital ecosystem?
- Where does this capital come from? Does the private sector contribute at all?
- What successfully incents coordination and alignment?

Global Goods: Success

2020 Target	2020 Stretch Goal	Long-term goal
• 90% of WHO intervention categories have at least one global good. • 45 countries are using at least two global goods.	• 100% of WHO intervention categories have at least one global good. • 60 countries are using at least two global goods.	• 100% of WHO intervention categories have at least two global goods. • 96 countries are using at least two global goods. • A network of entrepreneurs using global goods to build thriving local businesses.

Priority learning questions:
- What accelerates the adoption of global goods?
- How does Digital Square successfully and appropriately signal promising private sector products?
- Should Digital Square be thinking about data global goods as part of the continuum?
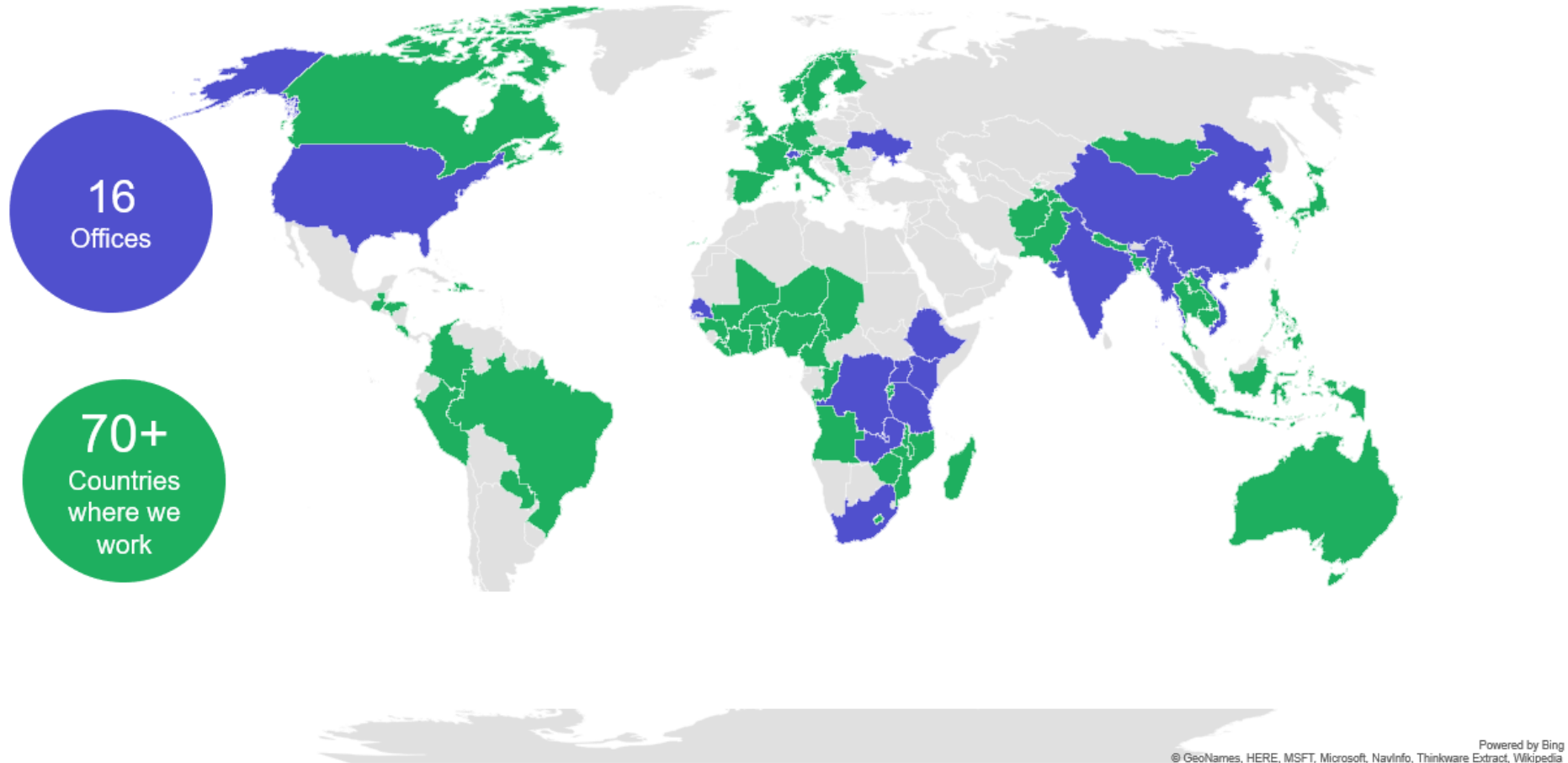
Regional & Country Systems: Success

2020 Target	2020 Stretch Goal	Long-term goal
• Currently supported initiatives have greater impact. • 50% of individuals participating in initiatives can describe three or more examples of increased learning, sharing, or technical capacity.	• Four new direct country partners. • Launch of the Digital Health Applied Leadership Program. • 80% of individuals participating in initiatives can describe three or more examples of increased learning, sharing, or technical capacity.	• A thriving Digital & Data Leadership program for health leaders and technocrats. • A network of entrepreneurs using global goods to build thriving local businesses. • 90% of individuals participating in initiatives can describe three or more examples of increased learning, sharing, or technical capacity.

Priority learning questions:

- Is our current engagement with country health leaders adequate to ensure their needs are met by the global goods under development?
- Should more effort be focused on bridging the gap in understanding between technologists and health professionals?
- Does Digital Square have a unique value to add by directly supporting country governments on the digital transformation of health systems?

Digital Square leverages PATH's globally-based staff and activities in resourcing country and regional work

16 Offices

70+ Countries where we work

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Country Technical Assistance

Through a USAID buy-in mechanism, ministries of health can request technical and operational support with the guidance of USAID, including:

- Procurement, assessment, and **design of digital health implementations**.
- Development and implementation of national digital health **strategies**, **spend plans**, and **road maps**.
- **Creation of governance** and policy frameworks for digital health implementations.
- Design of **interoperable digital health architecture** across programmatic areas.

- **Harmonization of digital health. implementation plans** across multiple projects.
- **Landscape analysis** and **inventory** of existing digital health tools.
- **Integration** of existing information systems.
- **Customization** of common digital health tools (e.g., DHIS2).