

Digitizing Healthcare Demand and Supply in Africa: A People-Centered Approach



FRIENDS
OF THE GLOBAL FIGHT

AGAINST AIDS,
TUBERCULOSIS
AND MALARIA



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Cover photo: Workers at Abuja national warehouse in Nigeria stock health care supplies as part of the Nigeria Supply Chain Integration Project. The Global Fund/Aurelia Rusek.

Executive Summary

Entrepreneurs and innovators across Africa are harnessing the power of digitized demand—data on the goods and services that people want—and, in effect, beginning to catalyze the transformation of health supply chains. Addressing a host of longstanding supply chain challenges, including fragmentation, stockouts and poor visibility and forecasting, emerging entrepreneurs are co-designing localized digital health solutions that better connect people with providers and products when and where they are needed.

By increasing the availability and affordability of healthcare services and supplies, many entrepreneurs and innovators are supporting the growth of universal health coverage (UHC) and more robust levels of pandemic preparedness, in line with the goals of African governments. The burgeoning reach of these entrepreneurs is poised to introduce a paradigm shift that can help achieve equity of access.

With entrepreneurs rapidly enabling a demand-driven economy, the global community must align efforts to concertedly transform African health supply chains. Key to these efforts are three emerging areas of innovation: **digitized consumer demand, technology-assisted procurement and multi-sector collaboration embracing human-centered design**. Scaling up these interdependent components can drive lasting, meaningful change and improve health access and outcomes for Africa and beyond.

The critical path to success lies in shared objectives and goals. The global health community should ground efforts in strengthening existing government systems while integrating the competencies and perspectives of all stakeholders. While complex challenges abound, a multi-sectoral approach carries the potential to modernize African health supply chains and stimulate local economic development through investments in five key areas:



Capacity building: Technology in the health sector requires significant investment in capacity building for (1) government leaders to steward digital policies and regulations and (2) increased digital literacy across the entire supply chain workforce.



Local infrastructure: Development of more continental and sub-regional manufacturing and warehousing facilities will increase supply chain resiliency. Strengthening basic infrastructure to ensure a consistent supply of electricity will allow technology advancements to move toward closing the digital divide.

By increasing the availability and affordability of healthcare services and supplies, many entrepreneurs and innovators are supporting the growth of universal health coverage (UHC) and more robust levels of pandemic preparedness.



Governance and stewardship: Creation of policies guiding competition and ensuring adherence to human rights responsibilities across the digital landscape, including the use of data as a public good, can enable a regulatory environment conducive to the needs of people. Equity of access as well as privacy and security for all depend on it.



Enhanced financing: Strong, accountable investment models that frame innovation and transformation efforts as market opportunities are more likely to attract the monumental funding needed to achieve sustainability.



Research and development: The nascent introduction of digital innovations necessitates ongoing testing, learning support and robust feedback loops to ensure contextualized, secure and interoperable platforms and programs.

Making African health supply chains and health systems resilient requires acutely coordinated technological innovation and extensive investments at the local and regional levels in both the short- and long-term. Cultivating and strengthening these healthcare “ecosystems” will enable greater global health security for all.

Figure 1. Three Critical Areas of Innovation in African Health Supply Chains



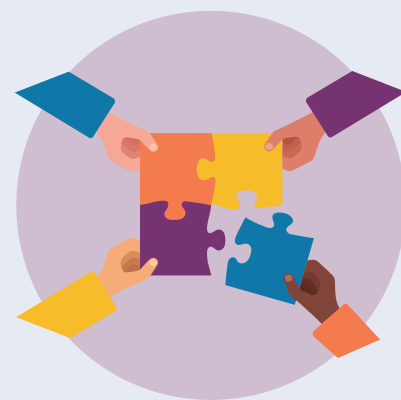
Digitized Consumer Demand

Improving forecasting, planning and delivery with data on goods and services people actually want



Technology-Assisted Procurement

Online platforms automating purchasing and logistics, freeing personnel-hours to expand healthcare access



Multi-Sector Collaboration

People-centered design by all stakeholders so innovations are most inclusive and equitable

Introduction

The COVID-19 pandemic placed health supply chains in the global spotlight, and in Africa, their disruption exacerbated human vulnerabilities.¹ Challenges rippled across the continent's commodity-driven health supply chains, heavily impacting sourcing and procurement, while consumer behavior unexpectedly shifted toward greater demand for healthcare goods and services.^{2,3} This substantial imbalance of supply and demand exposed the urgent need to identify more comprehensive, lasting solutions that could build health supply chain resilience.⁴

Fortunately if incidentally, the pandemic had the positive effect of accelerating digital connectivity and local tech innovation.⁵ With distinct understandings of their communities, entrepreneurs and innovators have been incubating and expanding user-focused, localized digital solutions that can leverage data on collective demand, enabling a growing number of people with access to the healthcare products and services they want and need.^{6,7,8}

In February 2023, Friends of the Global Fight Against AIDS, Tuberculosis and Malaria and the [Bay Area Global Health Alliance](#) (BAGHA) convened experts from multilateral, bilateral and government organizations, African NGOs, foundations, the private sector, non-profit groups and civil society to discuss the promising intersection of localized digital innovation and demand-driven supply chains to transform health systems and widen equity of access. Friends and BAGHA thank Salient Advisory for its insights and reports on health technology in Africa. Interviews with additional experts from across all fields provided key insights on how the global community can collaboratively grow supply chain innovation and transformation efforts to yield greater access to care.

This report highlights three key areas that stakeholders have identified as critical to the transformation of Africa's health supply chains: **digitized consumer demand, technology-assisted procurement** and **multi-sector collaboration embracing people-centered design**. Although these factors are distinct, their collective impact on ensuring equitable access to care is most powerful when embedded into healthcare ecosystems—where a network of partners cooperate and constructively compete to offer integrated services and products for the well-being of people.

Photo: Malaria related medicines are stored at the CMAM (Central de Medicamentos e Artigos Medicos) Zimpeto Central Warehouse in Maputo City, Mozambique. The Global Fund/ Karin Schermbrucker.



Today, Africa has more than 805 million mobile subscriptions and an internet penetration rate of about 43%.

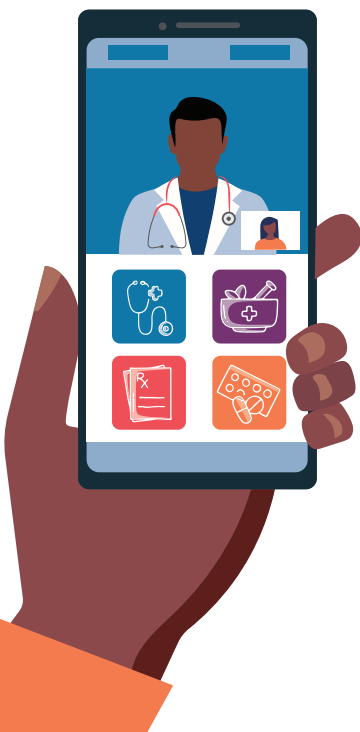
Digitized Consumer Demand: Starting with end-users

Modern supply chains are increasingly driven by consumer demand. Historically, data on demand was largely absent in African health supply chains. Early health commodity estimates were based on demographic and epidemiological data, often excluding or miscounting rural and marginalized people.⁹ Poor forecast accuracy made it challenging to provide health services and commodities in an equitable manner, as only those who could be physically seen could be accounted for.¹⁰

Today, Africa has more than 805 million mobile subscriptions¹¹ and an internet penetration rate of about 43%.¹² Technology is rapidly enabling a clear channel into what people—consumers, patients, mobile phone users, providers, community health workers, even those in rural and marginalized communities—need, want and consume. The profiles of the healthcare patients from just one or two decades ago are no longer the same as the profiles African health supply chains serve now.¹³

Digitized consumer demand—data on the goods and services that people want—allows seeing and better understanding these profiles. It empowers individuals to voice their changing preferences, open valuable feedback loops and receive the products and services they will use in a manner convenient to their lifestyles. This allows for enhanced engagement, trust-building and ownership among communities, creating a more responsive and sustainable ecosystem.

Leveraging the gains of digital connectivity, African entrepreneurs are building dynamic e-commerce and telemedicine platforms that cultivate local healthcare demand. In Ghana, for example, award-winning company¹⁴ [mPharma](#) provides a mobile phone-based platform that offers pharmacy services ranging from prescription medication and financing to home delivery and telemedicine services. In Kenya, startup [Zuri Health](#) similarly offers online prescription ordering and delivery, as well as telemedicine consultations via providers or 24/7 chatbot. These innovations capture and analyze real-time data on demand patterns, allowing for more accurate, responsive and balanced supply management. When the right amounts of products are delivered to the right places, at the right times, then agility and resilience can grow across the health supply chain.



Case 1. Digitized Demand: Nivi

[Nivi](#) is a digital health company started in Kenya and India that provides a chatbot program with on-demand health information to users via Facebook Messenger and WhatsApp. The company's mission is to enable individuals to make more informed decisions about their health, with a focus on generating awareness of public health topics, referrals to health services and supplies and feedback on and insights into community-level health needs.

Nivi's chatbot program is a prime example of a digital intervention that can turn needs into action and access. For example, in Nigeria, Nivi partnered with the Society for Family Health to provide information and guidance on family planning, reaching over 250,000 users and generating over 1,000 referrals to health facilities where users could access care and supplies.

Currently, Nivi is working with a network of local pharmacies to develop a QR code-based program that allows referred chatbot users to check into physical pharmacy locations and receive prescription and product information on their smartphones. Ongoing patient engagement through the program would enable healthcare outreach and follow-up, thereby strengthening the relationship between users in communities and health providers.¹⁵

Technology-Assisted Procurement: Equipping people with digital tools to improve supply chain processes and meet demand

Consumer data on healthcare demand opens the door for technology-assisted procurement (TAP) to advance access and equity.

Procurement of medicines and commodities in low- and middle-income countries, particularly across Africa, has long been challenged by forecasting and visibility issues, fragmentation and limited funding. Often driven by aid financing cycles and regulations, procurement of disease-specific, essential and new health commodities through poorly interconnected supply chain actors—regional procurement agencies, national governments, manufacturers, distributors, wholesalers, retailers, pharmacists and providers—has rendered health supply chain logistics deeply complex. These supply chain actors often rely on manual, paper-based processes tracking inventory and orders, especially at lower-level health facilities, which overburden an already thinly stretched health workforce.¹⁶



With nascent, real-time data on consumer needs for health, supply chain actors are gaining the critical information needed for procurement of actual needs and wants.

With nascent, real-time data on consumer needs for health, supply chain actors are gaining the critical information needed for the procurement of actual needs and wants. Internet-based TAP platforms can then help facilitate purchasing for connected supply chain actors across global, regional, national and local marketplaces. TAP platforms enable increased purchasing power and communication, as well as visibility of products from end-to-end through logistics management features. By streamlining tasks through automation, data analysis and artificial intelligence (AI), TAP can save time and reduce the risk of errors. Freed-up human and financial resources can then be shifted to improving other aspects of public health supply chains to ensure equity of access.

An increasing number of entrepreneurs and innovators are designing digital platforms that integrate demand with procurement. For example, in Kenya, health tech company [Maisha Meds](#) created a digital platform that leverages data from a network of over 300 clinics and pharmacies to support over 130,000 patients monthly in accessing more affordable, quality medications.¹⁷ In Nigeria, local tech startup [Remedial Health](#) shifted from operating as a private label wholesaler during the COVID-19 pandemic to becoming a broader procurement company for pharmacies looking to meet consumer orders within 24 hours.¹⁸ Local innovators offer a host of tools that could enhance recent public sector efforts in Rwanda, Sudan, Ethiopia and Nigeria^{19,20,21,22} to strengthen drug management agencies and advance procurement and supply chain activities.

Across global, regional and national levels, TAP platforms, such as the [Africa Medical Supplies Platform](#), can aggregate demand data, allowing for more efficient pooled procurement (bulk purchasing) efforts. By pooling procurement, governments and NGOs can negotiate better prices for health commodities, which help reduce the burden on overstretched healthcare budgets.^{23,24,25} Governments then gain process efficiencies, cost savings, quality improvement, reduced corruption and increased access to the health commodities most needed for their unique populations.²⁶

[mPharma](#) is also replicating the pooled procurement mechanism at the local level. mPharma offers a digital platform that provides innovative financing and inventory management solutions to hospitals, pharmacies and patients. The company aggregates and predicts demand from across its network in order to negotiate better prices from suppliers and manufacturers and purchase bulk quantities. mPharma then passes savings on to the health facilities they serve to result in more affordable and accessible healthcare for patients across the region.²⁷



Photo: A pharmacist dispenses malaria medication from a small Global Fund-supported clinic. The Global Fund/Nana Kofi Acquah.

Case 2. Technology-Assisted Procurement: Xetova

[Xetova](#) is a digital platform that aims to streamline the procurement process and reduce inefficiencies in the supply chain by using data analytics, AI and blockchain technology. Using data analytics, Xetova provides insights into procurement patterns, supplier performance and market trends. These insights help health ministries, hospitals, clinics and pharmacies make better-informed decisions when procuring health products. The platform also uses AI to automate repetitive procurement tasks, such as order processing and communication from suppliers. This automation reduces the workload for procurement teams, with the potential for them to focus on higher-value efforts facilitating access to healthcare.

Xetova works with partners across both the public and private sectors to co-design solutions that can power transformation and impact. Xetova is currently working with Kenya's Ministry of Health to help design data systems that will allow for the aggregation and anonymization of patient data sets, to protect people's privacy. Research is underway to translate these data sets into market insights on the delivery of essential medicines. Allowing visibility across the public sector would help accelerate data-driven decision making for multi-sectoral stakeholders.²⁸

By pooling procurement, governments and NGOs can negotiate better prices for health commodities, which help reduce the burden on overstretched healthcare budgets.

Case 3. Technology-Assisted Pooled Procurement: Wambo.org

Launched in 2016 by [the Global Fund to Fight AIDS, Tuberculosis and Malaria](#), [Wambo.org](#) is an online platform that aims to improve the availability and affordability of high-quality medicines and health products for low- and middle-income countries. Wambo.org enables national governments to purchase a wide range of health products directly from manufacturers at competitive prices through high-volume agreements.

Wambo.org encompasses a range of more than a thousand health products across several areas focused on HIV/AIDS, malaria and tuberculosis. The platform provides detailed information on product specifications, pricing and delivery timelines, enabling buyers to make informed decisions about their purchases.

The platform's success has grown in recent years. In 2020, Wambo.org facilitated the purchase of more than 800 million COVID-19 diagnostic tests, personal protective equipment and other essential health products. In 2021, Wambo.org processed over 2,000 purchase orders with a total combined value of US\$2.17 billion, and platform users reported a 91% overall satisfaction rate. Consistent and reliable progress through this digital innovation has been critical in providing access to essential health products, moving countries closer to attaining the goals of universal health coverage and pandemic preparedness.²⁹

With a human-centered framework, multi-sector stakeholders work together to co-create and iterate local solutions to complex challenges.

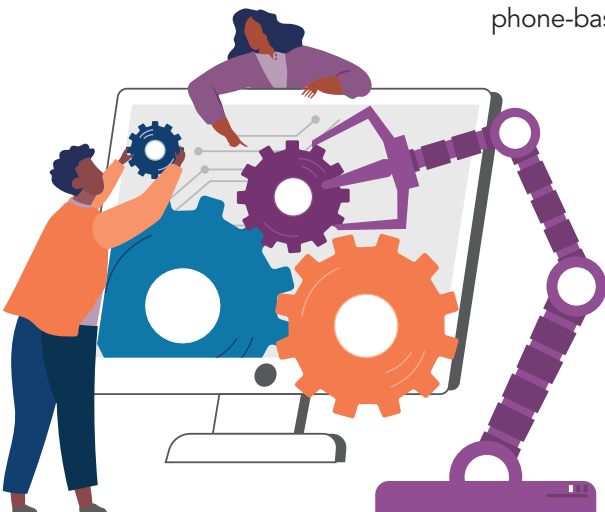
Multi-Sector Collaboration Embracing Human-Centered Design: Going further together, by co-creation

African health supply chains are intricately interwoven with global supply chains, making multi-sector collaboration necessary for data-driven transformation. As an integral part of the World Health Organization's (WHO) global strategy to institutionalize digital health systems (adopted by Member States in 2020), collaboration remains key to transformation efforts and building around people's needs and rights.³⁰

Technology is rapidly changing the consumer landscape across African nations, and the healthcare sector is lagging behind others in adopting data-driven supply chains.³¹ With much of the African population dependent on the public sector for healthcare,³² national governments in Africa are guardians and drivers of change. By processing deeply contextualized knowledge of the people, policies and systems they support, national governments could take the lead in successful health supply chain transformation.

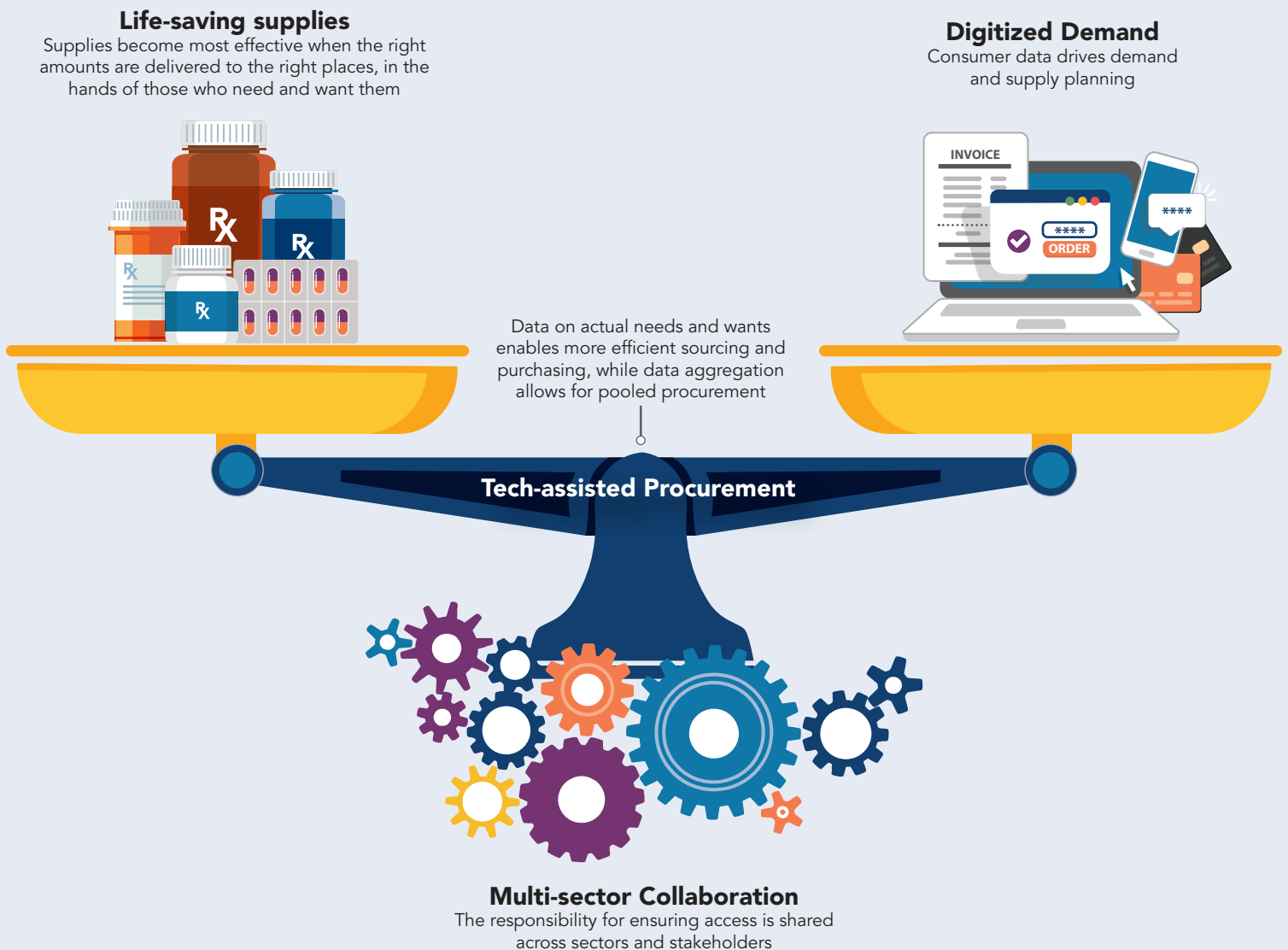
To move from ad hoc digital health solutions to coordinated national strategies, the responsibility for enabling access to products and services must be shared across sectors and stakeholders. Their various perspectives are best interwoven through design thinking—a human-centered approach that starts with a robust understanding of the end-users and their needs, in the context of what is viable and feasible. With a human-centered framework, multi-sector stakeholders – such as government leaders, health providers, patients, community leaders, designers and engineers – work together to co-create and iterate local solutions to complex challenges. This mirrors and borrows from successful multi-stakeholder approaches to decision-making and local implementation in global health for a quarter century, such as the Roll Back Malaria Partnership, GAVI (The Vaccine Alliance) and the Global Fund. By sharing perspectives in iteration over time, these stakeholders can develop digital health solutions that are culturally appropriate, inclusive and effective for the communities they serve.^{33,34}

In countries such as Malawi, Ethiopia, Uganda, Kenya and Rwanda, national governments are engaging in co-design projects with multi-sector stakeholders to digitally strengthen last mile delivery of life-saving commodities.³⁵ Mobile phone-based logistics management programs, such as [cStock](#), are leveraging the existing digital accessibility of community health workers to collect and analyze stock-level data of essential medicines and commodities at the community level.³⁶ Equally, healthtech accelerators like the [HealthTech Hub Africa](#) in Kigali are serving as important convening platforms that are empowering local innovators and ministries of health to co-create solutions that



serve local needs and put the patient at the center of solution and service design. By partnering with local innovators in this way, governments leverage unique skill sets and the lived experience and needs in communities to deliver more equitable access to healthcare, as well as see first hand the gaps in policies which need filling to integrate innovations into the public health system at scale—all propelling wider access to care.

Figure 2. Data-driven supply chains can more effectively balance supply and demand



Challenges and Recommendations: Looking back to leap forward

The development of African health and supply chain systems throughout the HIV and COVID-19 pandemics highlight the pressing importance of a people-centered focus – recognition of individual needs and contextual factors as the foremost key to problem-solving and innovation.³⁷ Across systems, health products are only life-saving when they are in the hands of those who need and want them. To better reach people with access to what they need and want, a number of challenges must be addressed through a multifaceted, multi-sectoral approach³⁸ spanning five areas: (1) capacity building, (2) local infrastructure, (3) governance and stewardship, (4) enhanced financing and (5) research and development.



Capacity building

A comprehensive strategy for capacity building is necessary for effective adoption of digital innovation across public health supply chains. This approach is two-fold. First, government stakeholders at the ministerial and executive levels need opportunities to share country-specific strategies and frameworks related to technology development, supply chain transformation and local innovation pathways. Second, digital literacy must be improved across the entire supply chain workforce, from government leadership to community health workers, in order to support co-design projects and accommodate changing workforce tasks, programs and expectations. Additionally, increased digital capacity across community-based health systems and services is needed for end-to-end inclusion. Enabling people with appropriate digital knowledge and tools to improve job functions can enhance trust, data quality and outputs.

Multilateral organizations – especially multi-stakeholder ones – and foundations can galvanize digital leadership development, while bilateral agencies provide sustained change management support and digital literacy assistance across supply chains. A public-private partnership approach to establishing a regional training center for supply chain actors would accelerate technical capacity building efforts. Private sector tech expertise can also be leveraged to support digital leadership development, acceleration of readiness and the implementation and maintenance of tech infrastructure.

Moreover, partnerships, innovation-sharing and learning between LMICs can enhance digital capacity in sub-Saharan Africa. For instance, India has played a leading role in the development of digital health, offering valuable opportunities to transfer innovation from India to other LMICs.

In-country digital providers and entrepreneurs are important to digital transformations which widen access. Technology solutions are often developed by private sector organizations, and even managed by private sector operators partnering with governments. Building the capacity

Individual needs and contextual factors are the foremost key to problem-solving and innovation. Health products are only life-saving when they are in the hands of those who need and want them.

of local businesses or entrepreneurs to develop local solutions is key, while anchored in human-centered design addressing communities' and users' needs.

To implement digitized demand platforms, capacity building initiatives must also account for areas of low literacy and digital literacy rates, especially in remote and underserved areas. Such inclusive initiatives should focus on enhancing users' comprehension and comfort with technology. Co-creation strategies can address some of these challenges, but the greater the user's understanding and comfort level with a program, the more likely they are to provide honest and accurate data inputs.

Local NGOs can partner with innovators to help facilitate inclusive engagement with appropriate end-users and ensure that digital innovations are culturally appropriate and effective. By continuing the engagement for evaluative purposes, NGOs can provide dynamic feedback to innovators and policymakers on areas for improvement and alignment with UHC priorities.

Governments should also prioritize building local capacity in digital health, including training health workers and data analysts, establishing tech incubators and supporting digital health entrepreneurs. Moreover, governments can address digital literacy and inclusion in their communities. By instituting enabling environments for people-centered innovation, governments can more effectively engage with these communities to co-design digital solutions for greater local needs.

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Local infrastructure

Accelerated development of local infrastructure for health supplies and supply chains is a cornerstone of more secure, resilient health systems. Africa manufactures just 3% of the medicines consumed on the continent,³⁹ which means that reliance on imported medicines and commodities causes financing, delivery and access delays that reverberate across the African supply chain,⁴⁰ especially in the face of disruptions from health, climate or humanitarian emergencies. To address this, the African Development Bank in cooperation with the African Union recently launched the [African Pharmaceutical Technology Foundation](#) (APTF). The APTF aims to accelerate local pharmaceutical production capacity by increasing the global market share of African pharmaceuticals from 30% to 45-55% by 2030, with estimated funding needs of \$11 billion to develop the industry and \$100 billion for the supporting infrastructure.⁴¹ A forthcoming [African Medicines Agency](#) is expected to develop frameworks for new pharmaceutical manufacturing.⁴²

Public-private sector partnerships must invest in continental health infrastructure development across the supply chain.^{43,44} Africa's health sector is rife with massive investment opportunities⁴⁵ worth \$66 billion annually—from local manufacturing (which is estimated to create 16 million jobs alone),⁴⁶ to warehousing and distribution capabilities that consider the nuances of African environments and hospitals and pharmacies that require expanded infrastructure and digital capabilities.⁴⁷ Such improvements

Many African countries lack the regulatory and governance structures to ensure data protection, privacy and interoperability.

would provide an opportunity for more efficient supply chains as well as workforce task-shifting to other critical needs of healthcare access, thereby alleviating existing fears of job loss due to the integration of automated technologies and AI, particularly at downstream levels.

The energy and telecom sectors play crucial roles in building both basic and digital infrastructure and providing tools to close the digital divide. Approximately 43% of the population, 600 million people, lack access to electricity.⁴⁸ While sub-Saharan Africa's digital connectivity is growing at one of the fastest paces in the world, about 67% of Africans lack access to broadband connectivity.⁴⁹ As meaningful online participation depends on high-speed broadband connection, energy and telecom companies must build and update core infrastructure and broadband networks to provide consistent service that can reach rural and marginalized populations. Continued investment is also necessary to make digital tools (such as tablets and smartphones), data rates and energy rates affordable for individual subscribers, health facilities and companies, which would enable equitable digital access.

Highly fractured data systems and interoperability challenges – the inability to exchange data across tech platforms – hinder gains in efficiencies across existing supply chains.⁵⁰ A number of countries including Ghana, Rwanda, Kenya, Nigeria and South Africa, are working with partners to develop and implement digital infrastructure with end-to-end supply chain visibility and may serve as models for other countries coming online with similar environments, needs and interests.⁵¹

Data sharing platforms at the regional and global levels are also needed to address overall data fragmentation. These efforts could learn from the Global Fund, President's Malaria Initiative, Bill and Melinda Gates Foundation and implementing governments, all of which are collaborating to integrate malaria-related data systems.⁵² High-level platforms that could be hosted by regional or global NGOs would enable cross-cutting real-time learning on demand and supply patterns, forecast disease trends and provide early warning systems for potential commodity shortages.⁵³



Governance and stewardship

Many African countries lack the regulatory and governance structures to ensure data protection, privacy and interoperability. There is a pressing need for national regulatory frameworks to address data sharing, consumption, security and verification.⁵⁴ Utilizing Transform Health's globally recognized Health Data and Governance Principles⁵⁵ as a springboard, an African-based authority is needed to spearhead continental and sub-regional frameworks and guidance on interoperability with an emphasis on patient privacy. At the community level, new and existing NGOs are needed to help advocate for and promote digital literacy, open standards, data privacy and security and ensure that marginalized populations are not left behind.

Digital health innovations cultivating healthcare demand are not necessarily inclusive. They must account for marginalization and gender

in providing equity of access. Policymakers and stakeholders need to align frameworks and incentives for digital health innovators to promote coordination, interoperability and sustainability to best serve equity of access to healthcare and global health security.⁵⁶



Enhanced financing

The African continent faces several challenges in financing public health supply chains and commodities in building resilient health systems. Previous and existing aid financing models have not been predictable or large enough to sustain long-term supply chain transformation and maintenance.⁵⁷ Transform Health estimates that \$255-382 million is necessary for 78 low- and middle-income countries to support the digital transformation of supply chains over the next five years.⁵⁸ New donor models, such as the PharmAccess Group’s Medical Credit Fund of blended financing,⁵⁹ are needed to structure the greater investments and development assistance necessary to ensure that health supply chain innovation and transformation avoids exacerbating inequalities. Strong and accountable financing mechanisms that frame efforts as business investment opportunities offer a likelihood to bring lasting change.⁶⁰

As multilateral organizations look to broaden their tech footprint and expand support for UHC goals and pandemic preparedness, they are particularly well positioned to co-design stable long-term funding opportunities for the development and implementation of digital health supply chain solutions, alongside the private sector and national governments.^{61,62} Bilateral agencies, foundations and nongovernmental donors can support governments in designing and implementing new financing mechanisms and contracting agreements that better reflect local health supply chains and markets.

For local digital innovators, predictability and stability of financing are necessary to ensure a viable path for innovation, integration and growth. Foundations and other nongovernmental donors are well-positioned to provide initial and performance-based funding opportunities for early- and growth-stage digital health supply chain innovation programs. They can help to de-risk adoption of innovations in public-private collaborations by prioritizing locally developed projects that are anchored in value for money—demonstrating cost-effectiveness for health systems with rigorous criteria for measuring success.

Digital innovators moving from pilots to program implementation require consistent and ongoing support.⁶³ While these innovators are anticipated to reach financial sustainability at economies of scale, bilateral and technical agencies, such as the U.S. Agency for International Development (USAID), Chemonics and Clinton Health Access Initiative, can help facilitate growth through wider access to supply networks and the populations that need them. Moreover, incentives must be created to boost (1) domestic resource mobilization by low- and middle-income countries’ governments (without donors ending aid precipitously) and (2) risk appetite of innovators and private sector manufacturers.

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Research and development

The nascent introduction of demand-driven technologies requires ongoing support for research and learning to ensure feasibility, security and user inclusivity. Mirroring the recently established WHO Innovation Hub, local tech and innovation hubs, supported by government partnerships, could provide the design-thinking environment needed for better digital health development. Support for innovation stages ranging from sandboxing (isolated prototyping of concepts) to user testing, would ensure robust feedback mechanisms and identify synergies or potential unintended consequences of digitizing traditional African health supply chains. Independent research and evaluation of digital solutions that demonstrate success and cost-effectiveness would provide an evidence-base for scale-up.

Figure 3. Summary of potential multi-sector roles for collaboration



	Capacity Building	Local Infrastructure	Governance & Stewardship	Enhanced Financing	Research & Development
National Governments	✓	✓	✓	✓	✓
Multilateral Organizations	✓		✓	✓	
Bilateral Agencies	✓		✓	✓	✓
Local & International NGOs	✓	✓	✓	✓	✓
Foundations & Non-government Donors	✓	✓		✓	✓
Private Sector	✓	✓		✓	✓

Table 1. Recommended actions for stakeholders

Stakeholder	Recommended Actions	
Multilateral Organizations	<ul style="list-style-type: none"> Galvanize creation of conducive regulatory environments for technology and innovation Co-design larger, long-term, stable funding with national governments and private sector partners for health supply chain innovation and transformation 	<ul style="list-style-type: none"> Support governments in designing and implementing new financing mechanisms and contracting agreements Provide sustained change management support for governments undergoing supply chain transformation
Bilateral Agencies	<ul style="list-style-type: none"> Support the development of continental and regional frameworks and guidance on interoperability, patient privacy and security 	<ul style="list-style-type: none"> Provide digital literacy training and technical assistance for transformation across health supply chains
National Governments	<ul style="list-style-type: none"> Share strategies and frameworks related to local technology development, innovation and transformation with other nations Increase digital capacity of government leadership, supply chain actors and cadres of health workers – including health data analysts Establish local tech hubs for coordination and align incentives for innovators to ensure interoperability and sustainability 	
Foundations & Nongovernmental Donors	<ul style="list-style-type: none"> Support governments in developing interoperable data platforms Design new financing mechanisms, contracting agreements and incentives that boost domestic resource mobilization De-risk government adoption of innovation with performance-based funding opportunities for early and growth-stage entrepreneurs and innovators 	
Local & International NGOs	<ul style="list-style-type: none"> Feed into high-level data sharing platforms and spread best practices for public health monitoring Partner with governments and agencies to provide change management support and technical assistance Partner with local innovators to facilitate inclusive engagement with end users in need and dynamic feedback for quality improvement Provide digital literacy training across supply chains, with focus on community-based providers and health workers Promote the need for digital literacy, data integrity, privacy and security across communities 	
Private Sector	<ul style="list-style-type: none"> Support digital leadership development, acceleration of readiness and the building and maintenance of tech infrastructure Invest in local digital health entrepreneurs offering mentorship, technical assistance and funding Invest in building continental health infrastructure, including manufacturing, warehousing and training facilities Share expertise on design thinking and human-centered design for products and programs 	
Innovators	<ul style="list-style-type: none"> Co-design with other private sector and civil society stakeholders inclusive products, processes and programs prioritizing value for money, UHC and pandemic preparedness 	

Case 4. Investing in Innovation: A Novel Incubator Model

[Investing in Innovation \(i3\)](#) is a pan-African program designed to jump start the commercialization and impact of 60 promising early and growth-stage companies with grants and access to market support. i3 supports the development of companies focused on data-driven distribution of health products, including medicines, consumables, medical devices, assistive technologies and medical waste in African healthcare systems. The program seeks to transform the availability, accessibility and affordability of health products at scale, creating health impact and prosperity in local communities.

i3 also places a strong emphasis on partnership building, working closely with African institutions, donors and industry leaders to facilitate the systematic deployment of grants and establish access to market mechanisms to connect startups to customers who can drive their impact at scale. Spearheaded by a unique coalition of donors—MSD (“Merck & Co., Inc.” in the U.S.), AmerisourceBergen, Bill & Melinda Gates Foundation, Chemonics and Microsoft, the program helps to create a more collaborative and supportive innovation ecosystem, enabling startups to access the resources and networks they need to thrive.⁶⁴

Photo: Shipments of mosquito nets arrive at a settlement in Western Uganda. The Global Fund is working to widen the pool of partners in global health to deliver life-saving medicines and other health supplies where they are needed most. The Global Fund/ Jiro Ose.



The Way Forward

Locally tailored innovations are showing immense promise to yield benefits for healthcare in African and other low- and middle-income countries. Demand-driven digital solutions are beginning to unlock a host of efficiencies for policymakers, providers and people, freeing resources to accelerate wider, equitable access to care. Moreover, data-driven decision making is enabling actors across the supply chain to transform systems for attaining UHC goals and pandemic preparedness.

The ownership and drive towards people-centered supply chain transformation are becoming increasingly prominent among national governments. Change is hard, and true transformation is even harder. Yet the COVID-19 pandemic showed that during a pivotal moment in modern history, transformational change can happen when stakeholders coalesce around the needs of people.

Africa has the world's youngest population, presenting a unique opportunity for the continent's youth to expedite the uptake of technology and innovation faster than previous generations. If on an ongoing basis stakeholders in Africa can lay the groundwork to effectively close the digital divide and prioritize people's voice, experiences and needs, there is marked potential for the continent to leapfrog generations of technology and catalyze far more equitable access to care. By doing so, a marked transformation of health supply chains and resilient, sustainable health systems will be possible for this generation and many more to come.

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