

What enables and constrains digital healthcare innovation in Sub-Saharan Africa?



Introduction

Primary healthcare (PHC) is the fulcrum of most health systems and as it is often the entry point to the rest of the health system, PHC facilities tend to be overburdened and under-resourced – especially in low- and middle-income countries (LMICs). The previous four briefs in the Tech-enabled Healthcare Innovation series have shown how technology in PHC provides immense potential to improve efficiency, access, patient experience and health outcomes.

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According to the World Health Organization (WHO), at least half of the world’s population lack full access to essential health services.¹ This creates the opportunity for health technology (health-tech) companies, particularly those operating in LMICs, to find innovative ways to improve access to PHC.^{2,3} In turn, their innovations are transforming the way patients, healthcare providers and funders engage with the health system to enable more equitable access to quality healthcare.

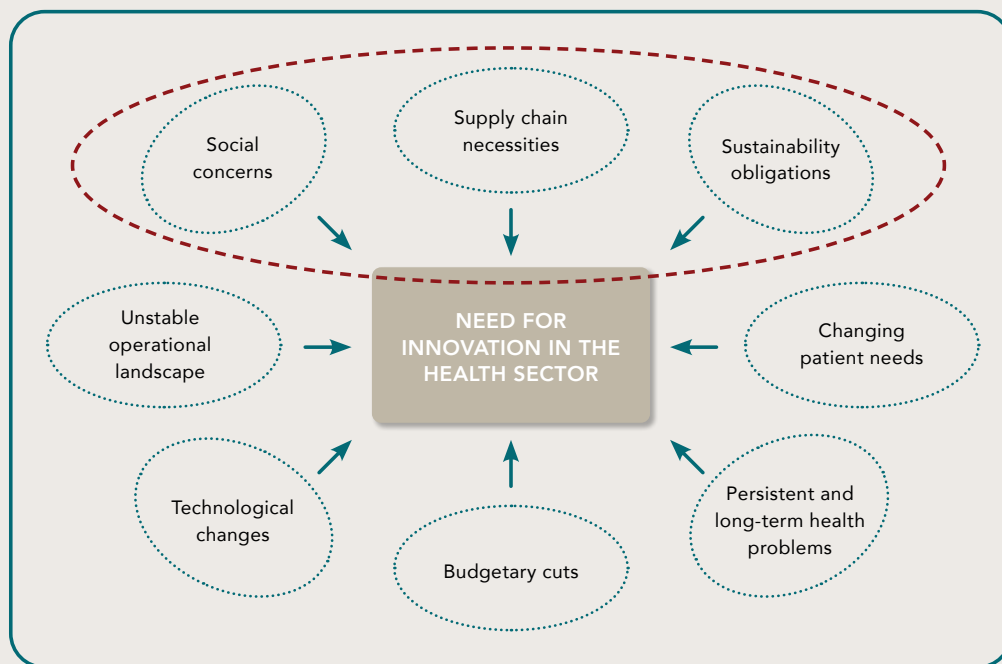
ABOUT THIS SERIES

This series of five briefs describes the current use of tech-enabled PHC tools in Sub-Saharan Africa. We highlight the key lessons and insights from some of the leaders in innovation, and put forward the enablers and constraints that exist in this resource-constrained setting.

Implementing innovation in PHC may also impact downstream health outcomes and costs by preventing disease progression and reducing the number of patients presenting at secondary and tertiary healthcare facilities.⁴ The need for more cost-effective ways of delivering care that keeps patients out of healthcare facilities is particularly pertinent due to the ongoing Covid-19 pandemic. Facilities are overburdened and health budgets have come under severe strain due to pandemic-induced economic pressures.²

The forces driving the need for innovation, described in the framework in Figure 1, have been exacerbated by the pressures of the pandemic. Although this framework outlines these forces well, it’s worth noting that they may vary between public and private healthcare sectors.⁵ Innovation in the private sector is more agile and motivated by technological changes, competitive behaviour, changing environments, product lifecycle and/or customer needs.⁵ Innovation in public services usually arises in response to more long-term problems such as long-standing delivery challenges, fiscal pressure or a sustained increase in demand.⁵

Figure 1: A conceptual framework for exploring the forces driving the need for innovation in the healthcare sector⁵



This brief aims to help local and international innovators, developers, entrepreneurs and health-tech funders understand the current health-tech landscape and opportunities in Sub-Saharan Africa, while gaining insight into the potential challenges

of healthcare technology. It also aims to unpack the drivers of and hindrances to the success of tech-enabled healthcare tools to improve PHC in each region, while drawing on learnings from case studies presented in the earlier briefs.



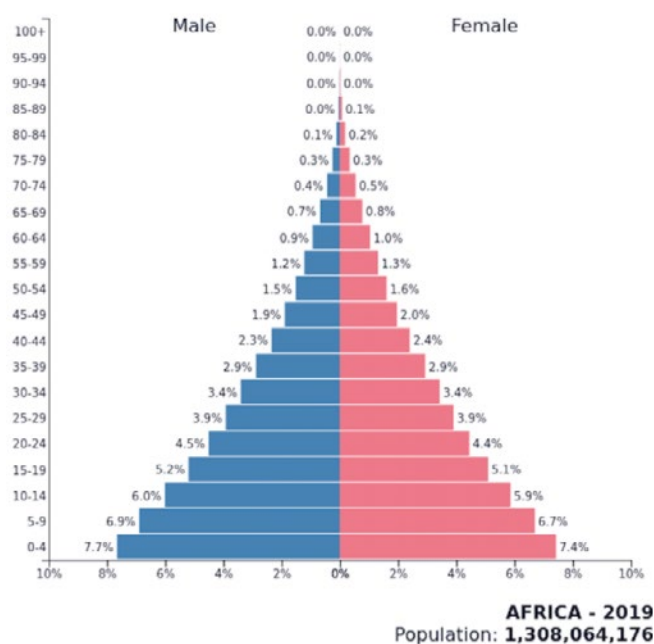
Sub-Saharan Africa – fertile ground

Although there's evidence of increasing financial investment in Africa, the majority of countries on the continent are classified as LMIC with high levels of poverty and inequality.⁶ This inequality also translates to inequality in terms of access to quality healthcare, leading to poorer health outcomes – particularly for the most vulnerable. Despite the weight of evidence showing that PHC is linked to better health outcomes, greater efficiency in the health system, and more health equity, it's not always prioritised when it comes to funding.⁴ A study by Deaton and Tortora (2015) showed that Sub-Saharan Africans have the lowest levels of self-reported health status in the world, with 58% reporting that they're unsatisfied with the availability of quality healthcare in the area in which they live.⁷ This shows a clear need for improved access to quality, affordable healthcare services.

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Sub-Saharan Africa also presents an opportunity for investment in innovative technology that solves its unique challenges. African-based technology start-ups managed to raise more than USD 700 million in 2020 – an increase of 28% from the previous year. This is seen as an indication of the African tech market's growth potential.⁸ With its young, burgeoning middle-class population that's technologically literate and willing to adopt digital tools, the region shows promise for disruptive technological solutions.

Figure 2: Population pyramid for Africa⁹



Covid-19 prompted national lockdowns and stay-at-home orders across the region, all aiming to slow the spread of the disease.¹⁰ In some countries, the disruption of health services due to specific demands related to the pandemic – coupled with fears of accessing healthcare facilities –

created a need for remote access to healthcare. A pertinent use case created an opportunity for tech-enabled healthcare to show its value. Before Covid-19, Sub-Saharan Africa was already rapidly embracing tech-enabled solutions, and mobile subscription coverage and smartphone adoption were respectively expected to reach 50% and 65% by 2025.¹¹ In addition, mobile health (mHealth) has established itself as a powerful pathway for expanding the reach of healthcare services in the region.

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This section highlights factors that enable and constrain the development and success of tech-health innovations. Our learnings are categorised into three groups: factors affecting the sustainability and scalability of innovations, trust and transparency, and keeping innovation simple and seamless.

2.1 Sustainability and scalability

Understanding the target market and developing a tool that meets their needs.

Triggerise¹ is a non-profit organisation (NPO) that uses mobile technology to drive positive behavioural change in teenage sexual and reproductive health (SRH). Investing in research of the nuances of their adolescent target market, they centred the design and marketing of their service on the results of these studies, while being aware that although all their clients share a common need for healthcare services, not all of their patients are the same. Triggerise segmented their clients based on factors that influence their health-seeking behaviour and adoption of a digital health solution, such as age, gender, geographic location and income. They also devoted time to understand their clients' vantage points by studying their unique engagement patterns, and the language needed to build trust with their target market. As a result, Triggerise developed a sophisticated incentivisation and behavioural economics strategy, which enabled them to reach more than 1.3 million adolescent girls in four countries since 2015, with 91% of their registered users currently accessing care.¹²

¹ To learn more about Triggerise, please read the fourth paper in this series: *Mobile Health Innovation in Self-Management: Lessons and insights from Sub-Saharan Africa*.

² To learn more about WelTel, please read the fourth paper in this series: *Mobile Health Innovation in Self-Management: Lessons and insights from Sub-Saharan Africa*.

“Clear value propositions ensure uptake, which in turn drives scale and ensures that innovations achieve their desired impact.”

Well-considered business models that offer a clear value proposition.

Although Africa presents a great opportunity for innovation, these advancements still need clear value propositions as well as sustainable business models. Clear value propositions ensure uptake, which in turn drives scale and ensures that innovations achieve their desired impact. WelTel², an NPO that supports the management of HIV, tuberculosis, immunisations and COVID-19 initiatives, has expanded its reach to multiple countries and developed a robust body of evidence to support its clinical success. It has however struggled to achieve scale due to its funding model.¹² WelTel has been reliant on external donor funding in order to operate, meaning that its ability to scale, reach more clients and achieve greater impact is determined by how much funding they receive. The innovation is therefore not self-sustaining. It's an issue faced by many innovators aiming to provide essential services to the poorest segments of the population who are often unable

to pay a sustainable price. Fortunately, WelTel has managed to secure additional funding, which has allowed them to expand their reach. As an NPO, Triggerise is also reliant on donor funding. In their case, they've been able to scale their solution rapidly by incentivising uptake through positive behavioural reinforcements. Additionally, their solution's sustainability is supported by leveraging private healthcare facilities and lifestyle service providers to make private healthcare more accessible and cost-effective for the end-user.¹³

"An authentic commitment to problem-solving requires agility – and adapting to solutions as problems on the ground change."

Adaptability is fundamental to success.

An authentic commitment to problem-solving requires agility – and adapting to solutions as problems on the ground change. Living Goods' Smart Health app is a clinical decision support tool for community health workers (CHW) in Uganda, and it also provides digital workflow and diagnostic recommendations based on digitally prompted data inputs completed by the CHW. Their business model was initially to support the independent sale of medication by CHWs, but as Uganda moved towards Universal Healthcare Coverage (UHC), this business model was no longer viable. As a result, they pivoted their focus to the distribution, budgeting and quality management of free medication, supporting Uganda's move towards UHC.¹⁴

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Deliberate change management and customer onboarding.

Irrespective of the mode of innovation, 'innovation will not perform its intended purpose until the appropriate building blocks are in place'.⁵ When babyl, a mobile application that triages healthcare delivery, was rolled out in Rwanda, all health workers were trained extensively.¹⁵ This comprehensive training included customer care, IT, service delivery training, and even mock consultations with supervision.¹⁵ Although it was likely costly and time-consuming, babyl's holistic



strategy managed the various elements of change successfully. This included carefully considering all the human challenges that come with change – even remuneration for healthcare workers. Due to this strategy, the application has quickly become an acceptable platform within the local healthcare community.¹⁵ Patients posed a similar challenge, and patient-engagement strategies ought to be contextually adjusted to maximise their impact. For example, a significant proportion (35.6%) of people living in rural Uganda are illiterate or don't have access to mobile phones.¹⁶ When babyl launched in Uganda, they used in-person discussions with early adopters instead of a large media campaign to encourage the acceptability of the platform.¹⁵

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Partnering with governments creates value for the whole health system.

This has enabled the success and sustainability of tech-enabled healthcare innovations in Sub-Saharan Africa, where most of the population relies on public healthcare services. Partnering with the government ensures that an innovation is not only aligned with market needs, but is also acceptable and functional for all stakeholders (government,

healthcare providers and patients). The case studies presented in previous reports – the Living Goods' Smart Health app (Kenya and Uganda), upSCALE³ (Mozambique) and babyl (Rwanda) – illustrate how important working alongside governments throughout the development and implementation process is for the success of healthcare tools. Living Goods has worked alongside the Kenyan and Ugandan governments to train CHWs and ensure that the certification is recognised in both countries.¹⁴ upSCALE strategically involved Mozambique's Department of Health (MoH) when it created its interactive mobile application for CHWs, going as far as including the MoH early in the process of content designing, training, rollout and the hosting of the platform.¹⁴ This ensures that it remains well integrated in the healthcare system.¹⁴ babyl's partnership with the MoH in Rwanda enabled the platform's users to make use of the National Health Insurance, which insures the large majority of the population (93%).¹⁵ This partnership was a key component in expanding their reach while maintaining both end-user acceptability and the overall feasibility of the solution.



³To learn more about upSCALE, please read the second paper in this series: Digitally empowering community healthcare workers in Africa: Lessons and Insights from the Living Goods (Smart Health app) and upSCALE experiences.

Securing a sustainable source of funding.

As the WelTel case study showed, innovations that are primarily backed by external donors may face limitations with scalability. Much of the programme has been reliant on external donor funding, which can be difficult to procure and therefore limit scalability.¹² In contrast, public-private partnerships – or government funding – has supported the growth of other innovations. For example, Living Goods' reliable funding pool is comprised of various donors such as USAID, PEPFAR, The Children's Investment Fund Foundation, the private sector and governments. This protects it from the risks of over-reliance on a single source of funding.¹⁴



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2.2 Trust and transparency

First impressions matter in building consumer trust.

There are two aspects to consumer trust which need to be considered: firstly, the data privacy concerns, which can be mitigated with the appropriate regulations; and secondly, the trust built through consumer experience. The 2020 Accenture Digital Health Consumer Survey identified ‘lacklustre digital options’ as a barrier to the progress of health innovation.¹⁷ The study reported that a ‘bad’ digital health experience taints the entire provider experience and therefore reduces trust in healthcare innovation. Less than half of the surveyed customers would recommend digital platforms if they were not easy to use.¹⁷ Therefore, taking the time – as Triggerise did – to understand the client base, what their needs are, how they use the service, and actively measuring customer satisfaction, is key to ensuring that the client has a positive experience and continues to use the service.

It's important to empower patients.

Triggerise and WelTel are considered "self-directed care" tools, as they empower clients to better manage their own health and navigate healthcare access earlier and more successfully. This empowers them to be more informed and autonomous, and more active participants in their own healthcare. Health innovations that promote consumer independence, provide information and enable freedom of choice are more likely to be adopted by consumers, and are therefore more successful.¹⁸

"regulations must be drafted in a way that supports innovation and the fast-changing ICT landscape."

Outdated policy fails to cultivate a supportive environment for health innovation.

Although consumer protection and data privacy regulation are important for building consumer trust, these regulations must be drafted in a way that supports innovation and the fast-changing ICT landscape. For this reason, WelTel continues to lobby and advocate for "transparent and appropriate" digital health regulations in the countries in which it operates, as unclear policy poses a barrier to the development of health-tech solutions.¹² For example, onerous and poorly drafted telemedicine regulation in South Africa had previously stifled innovation in the South African telemedicine market, but recent relaxation of this regulation to allow for remote access to healthcare during the Covid-19 pandemic has enabled many new innovations to enter the market in a short space of time.³ These regulatory concessions

enabled clients to maintain social-distancing protocols and protect health workers, while still being able to access remote care.





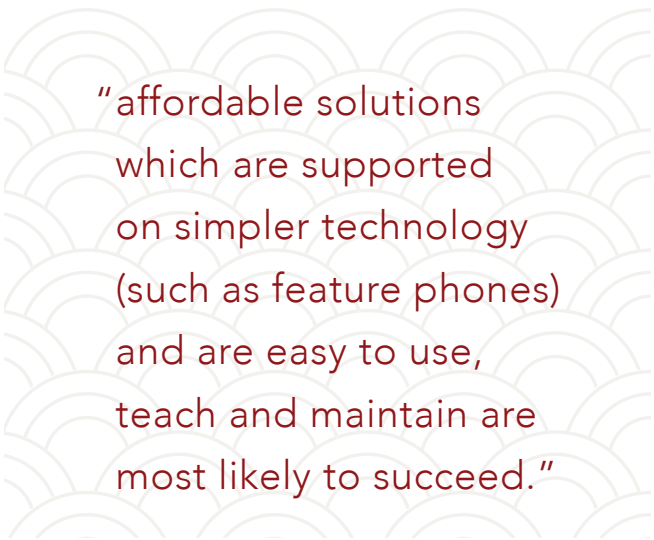
“Tech-enabled tools require both network and non-network related support, but technical support is a challenge in Sub-Saharan Africa.”

Therefore, affordable solutions which are supported on simpler technology (such as feature phones) and are easy to use, teach and maintain are most likely to succeed. The Triggerise platform is a simple SMS-based solution, which allowed them to deliver reproductive health services at a cost of USD 27 per Tiko/Triggerise user, compared to the USD 35 average cost in Africa.¹³ Similarly WelTel also delivers their services using SMS, and babyl uses Unstructured Supplementary Service Data (USSD) functionality, which are all supported on feature phones, meaning that their health-tech solutions aren't limited to those with smartphone or mobile data access only.^{12,15}

2.3 Keep it simple and seamless

Adapt solutions to the local context.

It's important to remain cognisant of the contextual challenges which include limited network coverage, lower levels of literacy and education, the diversity of languages spoken, poverty and limited funding. Infrastructural limitations, such as limited network coverage, may be constraints to the uptake and scaling of innovations. Tech-enabled tools require both network and non-network related support, but technical support is a challenge in Sub-Saharan Africa. Although Africa has seen a tremendous increase in mobile subscriptions and network penetration, widespread network coverage remains low, particularly in rural areas.¹⁹ In addition, South Africa remains the only country in Sub-Saharan Africa with 5G network coverage.¹⁹ Although 4G network is more widely distributed, it remains poorly adopted across Sub-Saharan Africa, with more than half of the available capacity reportedly unused.¹⁹ This translates into the challenges on the ground: limited access to network, limited or costly mobile data and poor connectivity. Non-network related technical challenges are also largely contextual. They include poor access to electricity and internet, smartphone illiteracy and mobile-phone security.¹⁴



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Automate as much as possible, but only if necessary.

Health-tech innovations should improve efficiency and user experience and not become burdensome to use. Involving the end-user in the development of the intervention can unmask areas of concern, which may hinder adoption. WelTel's product was initially met with scepticism from healthcare providers who feared the tool would increase their workload.¹² This is a common concern among healthcare workers who are already often overburdened and fear that having to learn new technologies will only add to their existing workload. WelTel considered this when they developed their service and addressed this pain

“Integration of data systems not only improves the quantity and quality of data available in the health system, but can also improve patients’ healthcare experience, reduce workload for healthcare providers and improve the management of resources.”

point by developing automations within their system which eliminated some of the existing inefficiencies within the health system that burden healthcare workers.

Integrated systems provide more value.

Health-tech innovations that support improvements in data quality and are interoperable with government information systems are of more value to the health system. For example, upSCALE is integrated with District Health Information Software 2 (DHIS2), free open-source software used for health data analysis, visualisation and sharing of data across various health programmes in several African countries.²⁰ This means that all data captured by upSCALE’s CHWs can be added to the local health system. Integration of data systems not only improves the quantity and quality of data available in the health system, but can also improve patients’ healthcare experience, reduce workload for healthcare providers and improve the management of resources. Improved access to data can also support governance by improving health provider accountability and facilitating informed policy-making.



Conclusion

Covid-19 has fast-tracked the development and financing of tech-enabled tools in healthcare. More than ever before, it's important to understand the factors that have enabled and restrained rapid innovation in health-technology tools. There are many lessons to be learnt from the diverse range of health-tech innovations presented in this series of reports.

The common theme throughout all the case studies is the need for innovators to have a deep understanding of their target market and context. All of these innovations are client-centred, collaborative in nature and they've created the simplest possible solution within the contextual limitations in which they are operating. Client-centricity drives uptake – which allows innovations to scale and become sustainable.

Technological tools are a particular operational challenge in LMICs due to low smartphone penetration, low internet connectivity, and other infrastructure constraints. However, innovators have overcome these challenges by using **simple** technology such as SMS or USSD instead of smartphone applications, as well as offline options and central call centres. Where tech-enabled innovations have been successful, they've had the support of **governments**. They've also **integrated** well with health systems – either through fitting into the workflow of health workers or integrating with public sector information systems. **Reliable funding** or a sustainable business model is key, and successful innovations have built **trust** in their service by considering the needs of all stakeholders – including patients, health workers, funders, partners and regulators.

“Client-centricity drives uptake – which allows innovations to scale and become sustainable.”

As much as Covid-19 has been a major catalyst for innovation, it's also brought about a more austere economic environment that has put health budgets in both high- and low-income countries under strain.

To ensure that LMICs maintain their momentum as they move towards achieving UHC, they must embrace innovative digital health solutions.



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