Scaling up Health Innovations in Africa

Drawing lessons from the winners of the inaugural WHO Africa Innovation Challenge

World Health Organization
REGIONAL OFFICE FOR **Africa**

Contents

Foreword

As WHO Regional Director for Africa my vision is to improve the way WHO conducts its business. Implicit in this vision is fostering the development of innovative approaches and solutions in line with our ambitious WHO Transformation Agenda, to support countries to attain Universal Health Coverage (UHC) and the health-related Sustainable Development Goals (SDGs). A growing body of evidence shows that the future of health in sub-Saharan Africa will be underpinned by the development and use of home-grown innovations that can be adapted to local needs.

The demand for health innovations in Africa is high and will continue to increase with emerging socioeconomic dynamics, for instance, the burgeoning youth population, unplanned rural-urban migration, epidemiological changes including noncommunicable diseases, infectious diseases like COVID-19 and Ebola, and climate change. I made a deliberate effort to institutionalize innovation as part of the DNA of our organizational culture, towards enhancing our contribution to improving the health of people on the continent.

In October 2018, I launched the first WHO Africa Innovation Challenge to source and select innovations that could be sustainably scaled to improve health outcomes and quality of life, and to offer solutions to unmet health needs in Africa. The response to this call was overwhelming, attracting over 2,400 entrants from the continent and beyond. This affirmed for me, WHO's strategic role in the innovation ecosystem. It was clear that if additional support is channelled to innovators and innovations, life-changing health impacts will be realized.

At WHO, we have closely supported and monitored the progress of the 30 top innovators in scaling-up their innovations. Drawing from the lessons and experiences of these innovators, I will ensure that we continue to play a leading role in fostering the development and harnessing of health innovations on the continent. In the same vein, I urge all stakeholders in the innovation ecosystem to further support innovation, including governments by putting in place innovation-friendly policies and incentives mechanisms to promote the development, scaling-up and adoption of innovations in the broader health system.

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Introduction

Innovation has proved to be a key differentiating factor for economic competitiveness and a contributor to sustainable development and improving the well-being of people around the world. However, more opportunities exist for innovation especially in health as many countries face challenges to expand health access to vulnerable populations, and to improve efficiency in health-care delivery systems by providing alternative and new solutions for diagnosis and treatment of diseases. Both technological and non-technological innovations have huge potential to address some of these challenges and to transform the health-care landscape in Africa.

Health indicators in the African Region continue to show slow progress despite global action towards reducing deaths among mothers and children, increasing life expectancy, and success in fighting infectious diseases[1]. Emerging socioeconomic dynamics and epidemiological changes related to migration and climate change are contributing to an increase in the burden of diseases in Africa[2]. These challenges will require new, tailored, innovative solutions. The Lancet Commission on the future of health in sub-Saharan Africa[3] highlighted the need for Africa-based and home-grown innovations to deliver improved health outcomes. The Commission asserted that the opportunities ahead cannot be unlocked with more of the same approaches developed at the same pace, but that countries and local innovators should be encouraged to chart their own sustainable path to improve the health of African citizens.

The potential for local innovators remains largely untapped in driving home-grown innovative solutions. These innovators can fill in gaps and seize opportunities where imported innovations may be unsuitable or poorly positioned for local context. If properly harnessed, homegrown innovations can leapfrog progress because of the relatively low switching costs of the existing systems and less burdensome regulatory environments, as witnessed by the ease of adoption of mobile payment systems in many African countries[4].

Africa is home to seven of the world's fastest growing economies and many countries with rapidly growing and youthful populations with ever increasing mobile penetration[5]. This makes the Region fertile ground for innovative market-based solutions. There are several examples of successful innovations spearheaded by young people such as computer-aided detection of tuberculosis in the Gambia, South Africa and Zambia, and smartphone powered, cloud-enabled portable electrocardiograph used in Malawi and Uganda[6]. These are just a few examples of the many initiatives underway to support collaboration and adoption of innovative solutions for health by governments and other partners in the Region.

Despite the promising outlook, health innovators in the African Region face numerous challenges in getting their innovations to scale. The study by the World Bank group reported that African countries

1   United Nations. The Sustainable Development Goals Report 2019
    https://unstats.un.org/sdgs/report/2019/The-Sustainable-Development-Goals-Report-2019.pdf (Last accessed November 2020).
2   Non-Communicable Diseases and Urbanization in African Cities: A Narrative Review https://www.intechopen.com/online-first/non-communicable-diseases-and-urbanization-in-african-cities-a-narrative-review (Last accessed November 2020).
3   The path to longer and healthier lives for all Africans by 2030: the Lancet Commission on the future of health in sub-Saharan Africa
    https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(17)31509-X/fulltext. (Last accessed November 2020).
4   Why Africa Has The Ability To Leapfrog The Rest Of The World With Innovation https://www.forbes.com/sites/francoisbotha/2019/04/02/why-africa-has-the-ability-to-leapfrog-the-rest-of-the-world-with-innovation (Last accessed November 2020).
5   How Technology Could Promote Growth in 6 African Countries
    https://hbr.org/2019/12/research-how-technology-could-promote-growth-in-6-african-countries (Last accessed November 2020).
6   How Can Digital Health Technologies Contribute to Sustainable Attainment of Universal Health Coverage in Africa?
    https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6873775/ (Last accessed November 2020).

invest far less in innovation (approximately 0.01% per capita) than advanced countries[7]. In addition to the lack of investment, the report showed that the majority of African countries lack, to varying degrees, the strong institutions, skilled human capital, appropriate infrastructure, technology and creative outputs, and market and business sophistication, that facilitate scaling of innovations. There is an urgent need to make funding and financing mechanisms accessible to African innovators, to include access to capital, and develop conducive policies related to regional cooperation and ease of doing business[8, 9]. Some analysis suggests that local innovators in Africa are less likely to be funded[10] despite annual growth in venture capital investments on the continent, with US$ 1.34 billion being raised by start-ups in 2019[11].

Studies have observed constraints in the Region specific to the health sector, such as weak health systems, poor coordination, lack of awareness and knowledge of emerging technologies, lack of interoperability, and lack of government commitment, which all contributes to the slow rate of diffusion of innovation[12]. There is a need to build the right regulatory environment for piloting innovations and new business models while investing in the infrastructure, human capital, science, and technology to enable uptake[13].

Seeking to address these challenges and support transformative health innovations, WHO Africa has implemented several innovation-focused activities in the context of its Transformation Agenda[14]. These initiatives aim to help countries accelerate progress towards universal health coverage (UHC) and health-related SDGs and support the development of high-quality health systems powered by continuous innovation to respond to changing population needs. One major milestone was the launch of the Innovation Challenge in 2018[15], which sought to source and select health innovations with a potential to address pressing health needs on the continent.

To inform these efforts and interventions, WHO Africa has undertaken a two-year follow up study on the best profiled innovators from the Innovation Challenge. This study aims to examine the experiences of African innovators in their innovation journey with the view to inform innovation ecosystem players that include governments, private sector, innovators, and other partners, to make informed decisions on what has worked, what strategies can be used to successfully scale high-potential health innovations in the Region, and what challenges remain.

This paper presents an overview of the initial observations from the 2018 WHO Africa Innovation Challenge and the subsequent analysis, observations and recommendations drawn from the experiences and insights of the innovators from the winning cohort upon follow up for two years.

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7   The Innovation Paradox Developing-Country Capabilities and the Unrealized Promise of Technological Catch-Up. https://openknowledge.worldbank.org/bitstream/handle/10986/28341/9781464811609.pdf (Last accessed March 2020).
8   BBC. The challenge in developing start-ups in Africa. https://www.bbc.com/news/business-47640710 (Last accessed November 2020).
9   The World Bank. Innovation in Africa. https://www.worldbank.org/en/news/speech/2017/11/30/innovation-in-africa (Last accessed November 2020).
10 Silicon Valley has deep pockets for African startups – if you're not African. https://www.theguardian.com/business/2020/jul/17/african-businesses-black-entrepreneurs-us-investors (Last accessed November 2020).
11 African Startups Raised $1.34 Billion In 2019. https://www.forbes.com/sites/tobyshapshak/2020/01/07/african-startups-raised-134bn-in-2019 (Last accessed November 2020).
12 The Lancet. Sub-Saharan Africa—the new breeding ground for global digital health. https://www.thelancet.com/journals/landig/article/PIIS2589-7500(20)30027-3/fulltext#articleInformation (Last accessed November 2020).
13 Africa can enjoy leapfrog development. https://www.worldbank.org/en/news/opinion/2017/10/11/africa-can-enjoy-leapfrog-development (Last accessed November 2020).
14 The Transformation Agenda of the World Health Organization Secretariat in the African Region 2015 – 2020. https://www.afro.who.int/regional-director/transformation-agenda (Last accessed December 2020).
15 WHO Africa Innovation Challenge: Promoting African Solutions for Africa's Health. https://www.afro.who.int/media-centre/events/world-health-organization-africa-innovation-challenge-promoting-african (Last accessed December 2020).

Study Design

Background and rationale for study

The inaugural WHO Innovation Challenge[16], which unearthed more than 2,415 innovative solutions[17] demonstrated the potential that exists on the continent for developing innovations to solve Africa's health challenges. On 8 November 2018, WHO in the African Region launched its first Innovation Challenge to identify, select and support innovators, researchers and community-based initiatives including, those led by youth and women, that are working on novel solutions that address unmet health needs to improve health outcomes for Africa. The Innovation Challenge prioritised innovative and scalable health-care solutions, which were broadly categorized as new or modified products, processes and social innovations[18].

Following this inaugural challenge, a two-year follow up study was instituted in September 2020 to assess the progress in scaling up solutions by the innovators that were ranked in the top 30 among all the innovation entries that were received. The follow up study was conceived to understand the institutional and systemic barriers and enablers that facilitate scaling up of innovative solutions at country level in the Region.

Methodology

2018 WHO Africa Innovation Challenge design

Solutions to the Challenge were considered under three broad categories for innovation, as defined below:

– Product or technological innovations comprised of activities that contribute to the research, development and design of new products or, to improving existing products, and that generate new technological knowledge for adoption by the marketplace e.g. medicines, products, supplies, infrastructure, mHealth, etc.

– Process or service innovations refer to the implementation of a new or significantly improved production or delivery method e.g. innovative financing mechanisms, etc.

– Social innovations are new strategies and organisations that meet social needs of all kinds, from working conditions and education to community development and health, that extend and strengthen civil society e.g. community health initiatives, health workforce strengthening, etc.

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16 WHO Africa Innovation Challenge: Promoting African Solutions for Africa's Health. https://www.afro.who.int/media-centre/events/world-health-organization-africa-innovation-challenge-promoting-african (Last accessed November 2020).
17 Winners of inaugural WHO Africa Innovation Challenge announced.
https://www.afro.who.int/news/winners-inaugural-who-innovation-challenge-announced (Last accessed November 2020).
18 Video Announcement: WHO Africa Innovation Challenge. https://www.youtube.com/watch?v=FGo9AC_icW0 (Last accessed December 2020).

The Challenge was open to solutions that met the following eligibility criteria.
Solution requirements were:

1. **African-relevant:** Solutions that are developed in and/or relevant to Africa
   in addressing one or more health-related problems or applying an innovative
   approach for delivering solutions in the African Region.

2. **Innovative:** Solutions that address one or more problems in a new and different way
   often through simpler and more effective means, that are novel.

3. **Scalable:** Solutions that are realistic and have the capability and potential
   to be enlarged and replicated.

The Challenge was open to individuals, teams, for-profit and non-profit entities (including hybrid entities i.e. social enterprises), and academic or research institutions. Entrants were not required to be formally registered to qualify for the Challenge. Applicants were required to be African nationals residing in Africa or outside of Africa; or foreign nationals either based in Africa or, if not based in Africa, then working with an African-based entity. Selection preference was given to solutions that had already gone beyond the "proof of concept". Preferred innovations were at the pilot stage of development, in the process of being scaled up, or were solutions in the early stage of commercialization in which regulatory procedures were completed and only required scaling up. Preference was also given to solutions that demonstrated ability or potential to address key health concerns in an accessible, affordable and sustainable way; and solutions that demonstrated evidence of ease of use, replicability, durability, and other relevant factors to justify appropriateness for low resource settings.

All applications were received through an online process via a dedicated website platform. Applicants were required to complete the full application form which comprised a series of questions, both mandatory and non-mandatory. To ensure a fair and thorough application process, applicants were requested to submit supplementary documentation to facilitate a better understanding of the submission for evaluation purposes, as well as to display proof of the validity and viability of the solution. The application call was open for four weeks and evaluation commenced once the application call had closed. The first review was against the eligibility criteria and those that complied went through to the next review phase. In the second review, each application was reviewed by two evaluators to ensure fair ranking and to prevent bias. Evaluators were appointed by WHO AFRO based on their knowledge and expertise in the proposed subject of innovation.

Applications were evaluated through a formal allocation process. Each application was scored on a scale of 1 to 5 (1 = very weak; 5 = excellent) against 5 evaluation criteria including: 1) Relevancy 2) Innovation 3) Impact 4) Implementation and 5) Scalability. The evaluation criteria and ratings were applied to each application, regardless of the health innovation category. The evaluation process was careful to guard against evaluating on information such as nationality, gender or age, and these details were omitted from the evaluation process. Evaluation scores were then weighted according to assigned criteria based on predefined priorities as agreed by WHO AFRO. These weightings emphasized potential impact, scalability and sustainability.

Two-year follow up study design

This study used a mixed method qualitative approach. All 30 2018 Innovation Challenge winners were followed up over two years to check their progress in scaling up their solutions. At the end of two years, a survey was conducted to gain more insights from 18 innovators that had demonstrated progress in scaling up their solutions. After completion of the survey, a subset of respondents were subsequently invited for interview. Quantitative responses were analysed using measures of central tendency and proportions as the cohort was relatively small (N=18). Qualitative answers were manually coded to group responses into themes.

Results

2018 WHO Africa Innovation Challenge

A total of 2,415 applications were received within four weeks. An overview of the applications is summarized in Figure 1, which depicts the number of people who accessed the application platform; categories of innovation; context for innovation deployment; demographic distribution of the applicants; and the regions from which the innovations originated.

Total Access

23,652 total access to platform over 4 weeks

Submissions

2,415 total application submissions received in 4 weeks

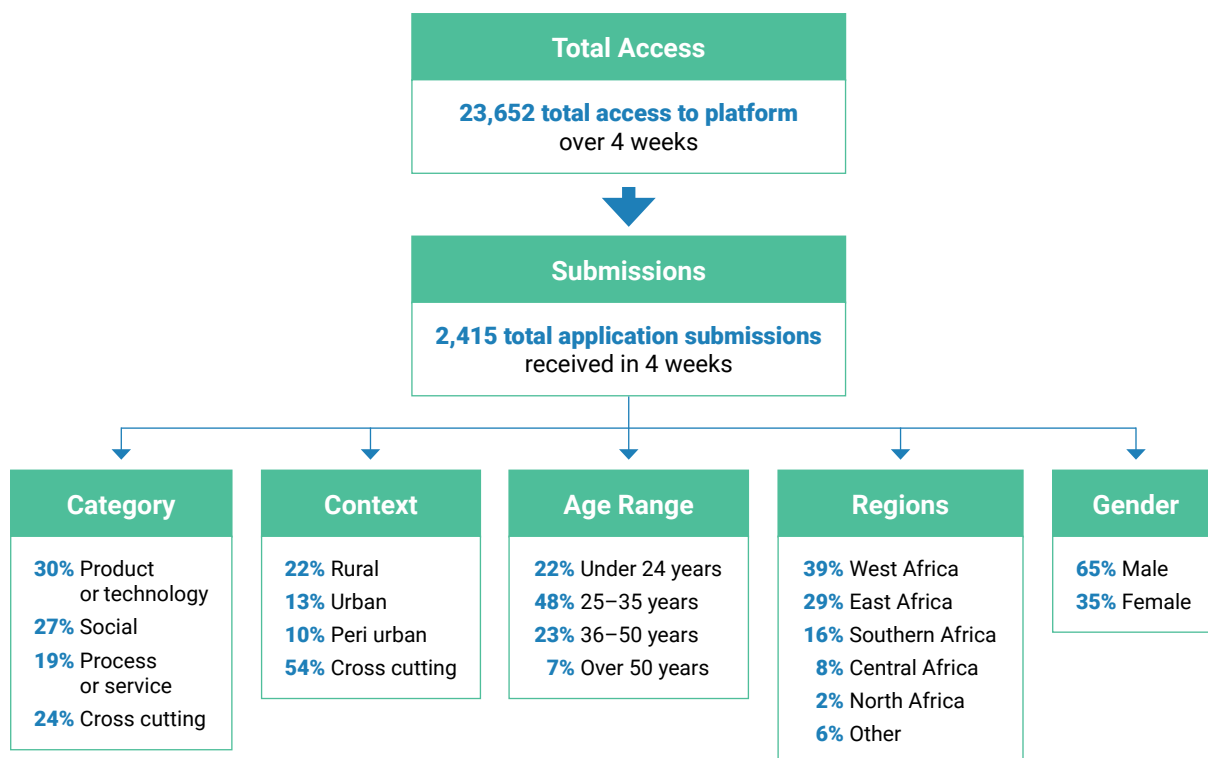| Category	Context	Age Range	Regions	Gender
30% Product or technology	**22%** Rural	**22%** Under 24 years	**39%** West Africa	**65%** Male
27% Social	**13%** Urban	**48%** 25–35 years	**29%** East Africa	**35%** Female
19% Process or service	**10%** Peri urban	**23%** 36–50 years	**16%** Southern Africa	
24% Cross cutting	**54%** Cross cutting	**7%** Over 50 years	**8%** Central Africa	
			2% North Africa	
			6% Other	

Figure 1: Profile applications received for the inaugural WHO Africa Innovation Challenge

Profiles of the winners of the Innovation Challenge competition

A total of 30 innovators were profiled to have developed the best innovations out of a total of 2,415 entries. The finalists were awarded a sponsored opportunity to showcase their innovations at the 2nd Africa Health Forum that was held in Praia, Cabo Verde on 26 to 28 March 2019[19]. Figure 2 provides an overview of the innovation profiles including the geographical distribution[20].

Category

13 Product or Technological Innovations

7 Process or Service Innovations

11 Social Innovations

Gender split

♂ **73%** Male | ♀ **27%** Female

Country split

- Nigeria: **7**
- Kenya: **3**
- Uganda: **3**
- South Africa: **2**
- Ghana: **2**
- Benin: **2**
- Ethiopia: **1**
- Namibia: **1**
- Burkina Faso: **1**
- Cameroon: **1**
- Zimbabwe: **1**
- Rwanda: **1**
- Angola: **1**
- Burundi: **1**
- Malawi: **1**
- Canada: **1**
- Netherlands: **1**
- UK: **1**
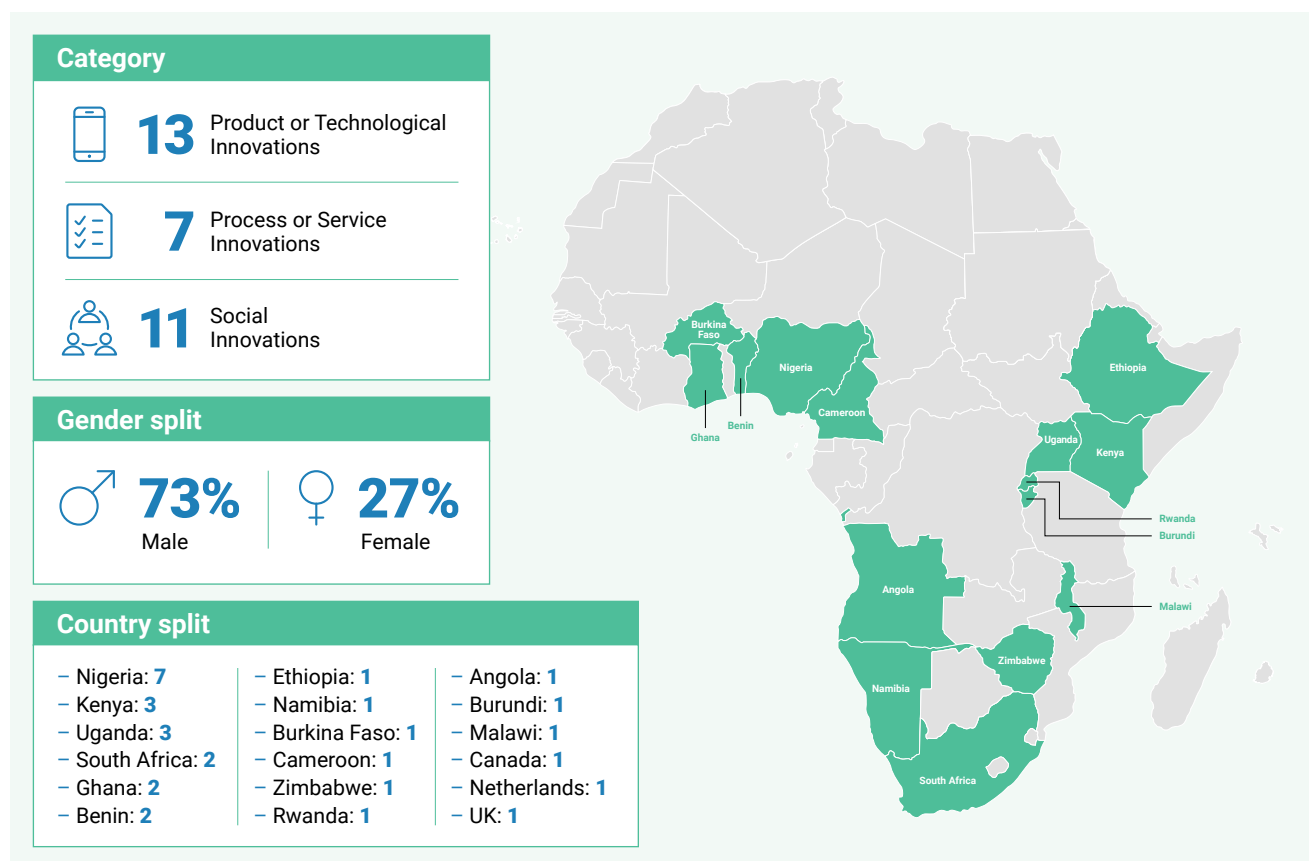
Figure 2: Profile of the top 30 finalists by type of innovations; gender including the youth; and country

19 Winners of inaugural WHO Africa Innovation Challenge announced.
https://www.afro.who.int/news/winners-inaugural-who-innovation-challenge-announced (Last accessed December 2020.)
20 Note: One innovator submitted two innovators that were selected bringing the total number of innovations considered in the final selection to 31 from 30 innovators.

Two-year follow up on progress made by the WHO Africa Innovation Challenge finalists

Through regular interaction with the innovators for the past two years, we noted that 18 out 30 innovators reported having made quantifiable progress on impact, scale and sustainability, while 12 other innovators abandoned their projects for various reasons during the course of the two years. Among the 18 innovators that were considered for the follow up study, eight innovators focused product-based innovations while six and four innovators focused on social and process-based innovations respectively as shown in Figure 3.

Category

8 Product or Technological Innovations

4 Process or Service Innovations

6 Social Innovations

Gender split

♂ **12** Male | ♀ **6** Female

– *Women were slightly more likely to respond with 6 of 18 respondents being female though only 26.6% of the cohort is female.*
– *The majority (48%) of respondents are young in the 26–35 age group.*

Country split

– Nigeria: **5**
– Kenya: **2**
– Uganda: **2**
– South Africa: **2**
– Ghana: **1**
– Benin: **1**
– Ethiopia: **1**
– Namibia: **1**
– Burkina Faso: **1**
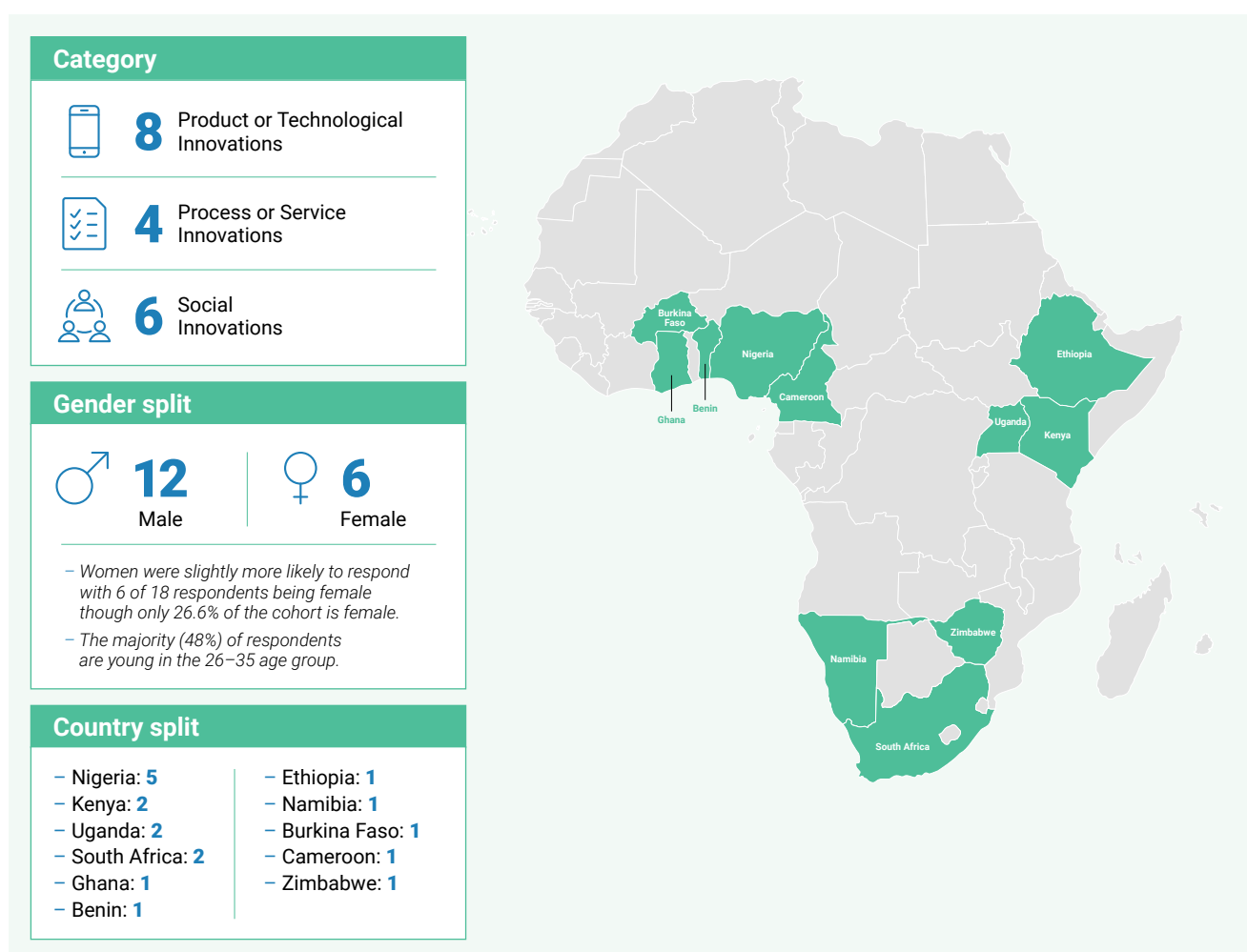– Cameroon: **1**
– Zimbabwe: **1**

Figure 3: Profile of the 18 survey respondents by type of innovations; gender including the youth; and country

Progress in deploying an innovation can be broadly quantified in respect of its impact on beneficiaries, scale and sustainability. In view of these three attributes, this study sought to delineate the critical paths of the 18 innovations being followed up and measure the level of progress according to those three parameters.

Progress on Impact

Recognizing that impact of innovation typically emerges many years into the future, the two-year timeframe was relatively short to demonstrate impact in terms of number of lives saved or improved and other long-term health outcomes. However, 94% of respondents reported they have managed to increase the number of employees, sites or services offered; or reported having reached more patients or clients. Interestingly, all the 18 innovations have been successfully positioned for the fight against or mitigate the effects of COVID-19. Fifty percent have leveraged their technological platforms to develop application tools specific for COVID-19 response.

Erq Ma'ed Media and Mental Health[21] in Ethiopia is a social innovation focused on the delivery of mental health services, improving access to care, and raising awareness. The project is a part of a broader social enterprise project, the Integrated Mental Wellness Program, which uses social media to drive social change and operates a pioneering center in Ethiopia that offers social awareness, psychological therapy, psychosocial training for youth, couples counselling and support for children and families. The program includes a bi-weekly radio show that reaches a national audience on mental health topics and offers a range of support under a fee-based model. Now, two years after the Innovation Challenge, the organization reported hiring six new therapists and journalists operating 12 hours a day, 7 days a week, reaching five million new radio listeners, and helping more than 3,000 families with mental health and psychosocial services/therapy. Erq Ma'ed receives over 20,000 calls for assistance each year from across the country. The innovation fit perfectly in the context of COVID-19 as the demand for mental health and psychosocial support increased. Erq Ma'ed provided services during the pandemic through teletherapy by delivering sessions through Zoom and registering people through the telegram messaging app[22]. The organisation has also spun off a school-based mental and social health program called SEED WELLNESS. This program is supporting the families, teachers, and counsellors through an integrated solution for quality education and youth-led community impact supported by digital technology.

In South Africa, the African Paediatric Fellowship Program (APFP)[23, 24] is a social innovation focused on health systems strengthening through improving the availability and quality of health-care providers for child health. This organisation has managed to build capacity for clinical paediatric workforce through research, and training across sub-Saharan Africa with training provided at the academic paediatric hospitals of three South African universities: University of Cape Town (UCT), University of Witwatersrand and the University of Kwazulu-Natal. The program works with institutions from Africa to identify and equip doctors with the skills, knowledge and expertise needed to optimize patient care, lead on new service developments, and build an evidence base for paediatric care in low-resource settings, targeting countries where no equivalent training exists. In the past two years, the program has increased the number of clinicians returning to over 120 practitioners, each delivering services to children which didn't exist before, with each practitioner trained to be an advocate and leader for implementing better access to care for children.

21 Integrated Mental Wellness Programme. https://innov.afro.who.int/innovators/ephrem-bekele-woldeyesus-22 (Last accessed December 2020).
22 Talk radio, teletherapy expands mental health services in Ethiopia.
https://www.afro.who.int/news/talk-radio-teletherapy-expands-mental-health-services-ethiopia (Last accessed December 2020).
23 African Paediatric Fellowship Programme: Building a Paediatric Workforce for Africa, in Africa.
https://innov.afro.who.int/innovators/professor-jo-wilmshurst-31 (Last accessed December 2020).
24 The African Pediatric Fellowship Program: Training in Africa for Africans.
https://pediatrics.aappublications.org/content/early/2015/12/08/peds.2015-2741 (Last accessed December 2020).

Whispa Health[25] in Nigeria is a service innovation that aims to equip and educate young people about their sexual and reproductive health (SRH) while connecting them to products and services in a discrete manner. WHISPA is a mobile app that provides young people with private access to a variety of SRH information, products and services including consultation, has the capability to make recommendations for the most suitable contraceptive method, taking into consideration medical and sexual history, and utilizes GPS to find "youth friendly" providers nearby. Since the Innovation Challenge, this organization has conducted over 3,000 paid consultations with their doctors and processed over 200 orders for sexual health products including HIV tests and contraceptives. The demand for services provided through the WHISPA app increased during COVID-19, as many youths could not easily access health facilities due to lockdowns, thus resorting to services provided online.

GeroCare[26] in Nigeria is a service innovation dedicated to addressing the absence of a structure for medical care for the elderly and improving on the current average life expectancy in Nigeria and the rest of Africa. GeroCare leverages technology to provide a structure for medical care for the elderly, in the context of traditional African family values in which adult children provide for the care of their parents. Gerocare allows Africans within and outside their home countries to subscribe for regular doctor home visits for their elderly family members, register patient details, and make payments through the GeroCare application. Patients are immediately matched with a doctor who is in proximity and provides monthly medical visits with regular status updates. GeroCare has reached more than 3,300 people in the last two years with over 11,300 home visits with detailed medical records and follow up monitoring. They have expanded services to include teleconsultations services and deploying a chain of ultra-mini clinics (Health Kiosks) that provide standardized outpatient services targeting the rural dwellers. These tools have also been able to pivot to provide tailored solutions for the high-risk elderly community in relation to COVID-19.

In Zimbabwe, AfriMom[27] is a social innovation aimed at improving reproductive and maternal health outcomes through improving service access and availability. AfriMom uses a text and smart phone based mobile application which includes a virtual women's clinic as well as connections to a physical women's clinic and several social media platforms. The innovation provides access to paid emergency contraception and pre- and post-exposure ART medication and connects pregnant women to local obstetricians and maternity clinics. The app also provides 24/7 support for women on all maternal and sexual reproductive health matters. Since the Innovation Challenge, AfriMom has reported an expansion of its services and promising early stage evaluation results related to care compliance. For example, the percentage of women receiving two or more injections of Tetanus toxoid during pregnancy is 80% among AfriMom users compared to national urban average of 40%. Timing of initial antenatal care (ANC) visits also improved two- fold in AfriMom users (62% of women had their 1st ANC visit before 4 months vs 34% national urban average). Afrimon adopted a partnership driven model where they have been able to partner with other innovators from the Region on bringing other innovations to the market. For instance, they have partnered with other innovators to develop VaxiGlobal, which is digital system for verifying COVID-19 certificates presented by travellers at points of entry in Zimbabwe.

25 WHISPA Health. https://innov.afro.who.int/innovators/morenike-fajemisin-20 (Last accessed December 2020).
26 GeroCare. https://innov.afro.who.int/innovators/dr-ebinabo-ofrey-16 (Last accessed December 2020).
27 AfriMom. https://innov.afro.who.int/innovators/dr-integrity-mchechesi-28 (Last accessed December 2020).

The Nigeria based technological innovation called eHealth4everyone[28] focuses on improving processes and data availability within health facilities across the country. It is an integrated supportive supervision (ISS) web-based platform that integrates several checklists used by health partners to make data easily accessible through a mobile application both online and offline. The solution enables GPS location, live signature and image capturing and storage, as well as ability to download data and attachments for analysis and to accept or reject data submissions, as required. The mobile app "Digital ISS" has been published on Google Play with over 1,000 downloads. The ISS has been used to assess the functionality of different systems at all levels of health care delivery for effective planning and management across the country with 23 states and 767 facilities. The data quality assessment (DQA) is used to ensure regular review of National Health Management Information System performance as measured by the level of data quality and the use of data for decision making in the country. The performance measurement has been completed in 13 states and 364 facilities. Through the ISS, it has been possible to monitor in real time utilization of essential health services in the context of COVID-19.

Progress on Scaling

As measured by progress in replicating and adapting an innovation across populations and other geographical areas, the study observed that all 18 respondents achieved relative growth. The continuum of scale ranged from increasing market share at sub-national level, to achieving market penetration to multiple sites in the countries of origin, and horizontal scaling in other countries.

Afyakit[29] is a Kenya-based technological innovation focused on improving the availability and quality of health service data for decision making. It is both a web and mobile based platform that contains digital supervision and analytics tools for health managers. The built-in analytics enable managers to receive colour-coded dashboards and detailed reports that highlight problem areas which can be aggregated at facility and administrative (e.g. sub-national) levels. In the past two years Afyakit has expanded beyond Nairobi to four of the eight sub-national regions in Kenya.

Significant progress on scaling was achieved by eHealth4everyone[30], which is a technological innovation focused on improving the processes and data availability within health facilities in Nigeria. The innovation has enjoyed increased adoption by partners such as the National Primary Healthcare Development Agency (NPHCDA), Global Fund (GF) and the National Basic Healthcare Provision Fund that are applying the technology for facility assessment and support. The Integrated Supportive Supervision platform (ISS) has so far been rolled out to 23 States in Nigeria with the funding from the Bill and Melinda Gates Foundation.

MAÏA Africa[31] is a product innovation targeting rural communities by reducing the burden of disease related to malaria in Burkina Faso. The product protects individuals from contracting malaria by

28 Multi-Source Data Analytics and Triangulation Dashboard.
   https://innov.afro.who.int/innovators/dr-ime-asangansi-11 (Last accessed December 2020).
29 Afyakit. https://innov.afro.who.int/innovators/dr-frida-njogu-ndongwe-5
30 Multi-Source Data Analytics and Triangulation Dashboard.
   https://innov.afro.who.int/innovators/dr-ime-asangansi-11 (Last accessed December 2020).
31 MAÏA. https://innov.afro.who.int/innovators/gerard-niyondiko-24 (Last accessed December 2020).

applying the first long-lasting mosquito-repellent ointment which has been developed in collaboration with Malaria Research and Training Center in the country. The MAÏA ointment business model leverages a distribution network of women recruited through microfinance organisations and empowers women including, those who are illiterate, to sell the product in their communities. For the past two years, the organization has distributed across Burkina Faso and been able to reach more than 20,000 people in peri rural and rural areas with plans to expand outside the country in 2021.

Incas Diagnostics[32] in Ghana developed diagnostic kit that provides improved point of care test for yaws, a disease impacting rural communities primarily in Ghana. The organisation created a molecular-based, point of care test solution for yaws using a much simpler device that can be easily and effectively administered in the field. The organization reported to have scaled up its supply of test kits to four countries - Ghana, Nigeria, Côte d'Ivoire and the United States. This organization has also been able to pivot and repurposed its expertise to develop a rapid test for COVID-19 to be produced locally as well as a mobile application for COVID-19 contact tracing.

The African Character Initiation Program (ACIP)[33] is a social innovation from Malawi that empowers adolescents with information through their identity and sexual desires to build their confidence and self-esteem and provides them with life skills and character values for successful transition to responsible adulthood. The community-based and participatory program provides a one-stop source of information on adolescent realities in a context of modernization and information explosion. The program has enrolled over 2,000 boys and girls through workshops and camps and directly mentored over 1,500 individual boys and girls. The ACIP has replicated the program within Uasin Gishu County in Kenya among adolescents in informal settlements and the program manuals are being implemented in Malawi and Nepal.

MobiCure from Nigeria has developed a mobile application called myPaddi[34], which is a digital solution that provides young people with access to accurate, unbiased, and youth-friendly sexual and reproductive health information that ensures complete anonymity. With the application, young people can connect and chat directly with doctors and counsellors on any sexual and reproductive health issue and be reassured to receive unbiased information. The digital solution has successfully scaled up across Africa in the last two years and is accessible to more than 50,000 users in 16 African countries and has served over 5,000 users with their telemedicine (consulting) service. The use of the myPaddi innovation surged during COVID-19 pandemic, driven by the need for young people to access sexual and reproductive health information.

Progress on Sustainability

In this study, sustainability of an innovation is viewed in the context of establishing a viable business model with a steady revenue generation. Alternately, sustainability was considered when an innovation has influenced policy changes in the way products and services are provided in which the innovation is mainstreamed in the delivery model. One key driver for sustainability is adaptability of the innovation

32 Rapid Molecular Test for Yaws. https://innov.afro.who.int/innovators/laud-anthony-basing-6 (Last accessed December 2020).
33 African Character Initiation Programme. https://innov.afro.who.int/innovators/professor-eunice-kamaara-25 (Last accessed December 2020).
34 myPaddi. https://innov.afro.who.int/innovators/dr-charles-immanuel-akhimien-7 (Last accessed December 2020).

to contextual needs taking into consideration reality on the ground. This study has showed that the majority of the innovators that have shown sustainable business have adopted a partnership-driven model, where they partner with government institutions through a private-partnership model.

An organisation from Cameroon called TrueSpec[35] developed a product innovation which is focussed on reducing the risk and impact of substandard and falsified medicines. True-Spec is a portable device that uses artificial intelligence to allow hospitals, pharmacies, pharmaceutical laboratories, and quality control centres to verify if certain drugs are genuine or falsified. This process takes less than 20 seconds and can be conducted anytime and from anywhere. The additional value of his innovation is that it contributes to building a database to help estimate the true impact of substandard or falsified medical products and to collect, structure, and systematically analyse accurate, reliable and quality data for Africa. In the past two years, the organisation managed to establish a viable public-private partnership which made it possible to raise over $170K in grants from international partners, the organisation. The product is currently experiencing strong demand in Senegal with plans to expand in the Region.

Mobicure[36], a company that provides a mobile app focused on providing and improving sexual and reproductive health services in Nigeria, has raised $400K through partners such as Grand Challenges Canada and is generating revenue with 20% month-on-month growth.

AfriMom[37] established a public-private partnership with the Harare City Council to perform maternal tele-ultrasound at all their clinics. The fees charged remain affordable, but the business model leverages the huge volumes of women who go through the City Council clinic and allows the organization to be self-sustaining through revenues.

Incas Diagnostics[38] in Ghana raised over $250K in grants and investment partnerships and is currently generating sustainable revenues with a 275% increase in 2020 over 2019 revenues. They reported leveraging strong political will and innovation friendly policies such as The National Entrepreneurship and Innovation Plan that has facilitated establishment of free trade zones, favourable tax policies for innovators under 35 and establishment of innovation hubs that provide business development support to innovators.

Restrizymes Biotherapeutics[39], which developed a Pan-Filovirus Rapid Diagnostic Test and other improved diagnostics related to viral haemorrhagic fevers for rural populations in Uganda, was able to raise over $250K of funding from government partners and revenues. The innovator reported benefitting from engaged governmental leadership that is committed to investing in local research and development, as is demonstrated by the establishment of the Ministry for Science, Technology and Innovation (MoSTI) and budgetary commitments making Uganda among the only three African countries investing 1.5% of their GDP in R&D as recommended by the African Union. They also have been able to demonstrate their increased capacity by pivoting to leverage extensive investments in R&D for the current COVID-19 pandemic response.

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35 True-Spec. https://innov.afro.who.int/innovators/franck-verzefe-21 (Last accessed December 2020).
36 myPaddi. https://innov.afro.who.int/innovators/dr-charles-immanuel-akhimien-7 (Last accessed December 2020).
37 AfriMom. https://innov.afro.who.int/innovators/dr-integrity-mchechesi-28 (Last accessed December 2020).
38 Rapid Molecular Test for Yaws. https://innov.afro.who.int/innovators/laud-anthony-basing-6 (Last accessed December 2020).
39 Pan-Filovirus Rapid Diagnostic Test. https://innov.afro.who.int/innovators/dr-misaki-wayengera-34 (Last accessed December 2020).

Challenges and Opportunities

The study observes the successes of the WHO Africa Innovation Challenge winners in scaling and expanding the reach of their innovations. It was clear from the innovators' feedback that challenges remain and that there is a need for coordinated and strategic policy reforms to support scaling of health innovations at the system level across the Region. Many of the barriers cited by innovators exist beyond the health sector but include other key sectors like education, finance, industry domains. Their experience confirms that a cross-sectoral approach to developing new partnerships and ways of working will be essential to the success of scaling efforts in many countries.

Many of the challenges reported by innovators relate to institutional issues or voids in their respective markets. Many challenges link directly to the political and economic context of specific countries and include issues such as corruption, barriers to foreign direct investment such as sanctions, political instability, etc. Other policy issues relate to domestic fiscal policy such as high rates of taxation or preference for imported solutions. In some areas there are clear policy gaps such as the absence of clear technology transfer mechanisms, clear data rights, and intellectual property protections for innovators.

It was noted that one of the major challenges facing innovators on the continent is lack of funding, as stipulated by 72% of the innovators. The challenges related to funding were multifaceted. They include lack of access to local investors, difficulties with currency exchange, timeliness of government awards, financial management issues – and, for those who are successfully scaling, they needed additional support in the management of revenue streams and improving their business model. External funding from international donors through grants dominate in terms of supporting local innovators, and this poses a huge sustainability challenge. There is a need for funding that accesses innovators where they are in a timely and sustainable way.

For many innovators who are successfully scaling, there are limitations such as access to technical support and skilled human capital to support the use of new and emerging technologies locally. For technological related innovations, the lack of ICT infrastructure presents a challenge which often requires partnership with governmental partners to address.

Innovators also noted that people continue to be at the heart of any innovative solution, and thus, culture plays a role in how innovations are successfully scaled. Some cultural elements that impacted efforts to scale included a lack of prioritization of local innovations, comparatively slow adoption of technology in the health sector, gender bias, and social acceptability barriers to innovations focused taboo areas of intervention such as sexual or mental health. Some innovators have been welcomed in the private sector but have difficulty accessing government leaders who are necessary to provide access to the public health system, which in many places, makes up most of the health system. Cultural elements were also occasionally cited as a key to success. Many innovators credited competitive cultures in their countries as an advantage as well as other cultural elements, such as being open to risk taking, being resilient in the face of challenges, and the youthful population's appetite for change.

Key Recommendations from the Innovators

It is clear from this study that the 2018 Innovation Challenge winners have made significant progress towards scaling. Their candid reports on their experiences and the challenges that remain generated a number of recommendations for key stakeholders related to supporting homegrown innovators to scale. These recommendations can be used to inform policy, tailored to the specific context, to reduce barriers and build capacity within innovation ecosystems for health innovations and beyond.

Governments

It is recommended to have innovation leaders and advocates in senior government that collaborate with innovators to inform policy and interventions related to supporting innovations within Member States.

Support could also be found within various supportive policies for innovations which governments are implementing such as the National Entrepreneurship and Innovation Plan in Ghana or the digital health committee and strategy in development in Zimbabwe. There is need for government to develop policies that are in line with the current social, economic and technological trends to continue to incentivize homegrown innovations.

1	**Innovation Ecosystem Networking** Government-led networking sessions for innovators in different sectors and other stakeholders
2	**Facilitating Public-Private Partnerships** Development of frameworks for facilitating public-private partnerships and other innovative financing models
3	**Monitoring and Evaluation for Innovation** Monitoring and evaluation of innovation programs to assess impact and ensure accountability
4	**Engaging Innovators as Advisors** Placement of innovators in institutions that support innovation and engage innovators to participate in regulatory and policy dialogues
5	**Improving the Business Environment** Improvement of the environment for doing business such as elimination of burdensome processes for establishing businesses and barriers to accessing capital
6	**Developing Related Policy Frameworks** Development of intellectual property and data protection frameworks to support innovators

These activities should exist within a larger policy framework that prioritizes local innovation and removes barriers to accessing the tools necessary to scale successfully such as tailored and diverse funding mechanisms, investment in supportive infrastructure, and development of skilled human capital.

Funders including the private sector

Recommendations in this area included development of funding structures that are more sustainable and corporate financing strategies with government engagement. They also noted a need for increased access to venture capital and other funds that African innovators can access in their own currencies. There is a need to prioritize investment for local innovations compared to imported solutions. These actors also have a role to play in fighting corruption and advocating for better coordinated regulations for formal market entry to address barriers to entry e.g. no recognition for telehealth for billing for services. It is recommended that funders work to create innovative financing mechanisms that address the specific concerns and challenges of African innovators. In addition to funding, innovators can benefit immensely from making use of the business operation platforms established by the private sector. For instance, the private sector can facilitate access to their manufacturing, distribution, marketing and communication platforms.

Development partners including civil society

Facilitate raising visibility for innovation through convening innovators to showcase their innovations at international forums. Development partners can host innovation challenges and facilitate connection of innovators with funders, researchers and partners that will be crucial to their scaling efforts. In addition to direct support to the innovators, development partner can influence adoption of impactful innovations by governments

Conclusion

This study on the 2018 WHO Africa Innovation Challenge has highlighted some of the successes and challenges surrounding the scaling of health innovations in the African Region today. The Innovation Challenge demonstrated the capacity for the African innovators to create innovative homegrown solutions that meet pressing health demands in their own communities. Many have been able to scale and have demonstrable impacts on their health systems and develop business models that are self-sustaining. However, these innovators continue to face challenges. These challenges will require a cross sectoral approach involving government, private sector actors, regulators, funders, educational institutions, research bodies and development partners from the health, education, technology, financing, infrastructure, and other domains.

The experiences and insight of these innovators have provided actionable recommendations for key stakeholder groups including governments. These recommendations can support implementation of both short- and long-term potential solutions that can be used to build capacity for supporting the scaling of innovations in the African Region. The observations shared in this report highlight the need for novel partnerships and new ways of working to address the cross-sectoral and multifaceted nature of the challenges innovators in the Region face. There are many opportunities to be found and additional studies should be undertaken to assess the impact of these innovation successes more fully in the long term.

The lessons learnt from the experiences of these outstanding innovators provided additional impetus for the WHO Africa to develop the Regional Strategy for Scaling Health Innovations in the African Region, which was endorsed by the Ministers of Health and delegates at the 70th session of the Regional Committee in 2020. Through this strategy, WHO and its partners are committed to play an integral role in supporting the scaling of health innovations, including intensifying advocacy for innovations at country level, connecting innovators to a valuable network to support scaling, and engaging in strategic dialogue that builds capacity within local and regional innovation ecosystems.

We hope that as African countries are supported to implement the regional strategy, that innovators and other actors in the innovation ecosystem will experience positive changes and create positive impacts in the health systems across the Region.