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Healthcare Innovation in East Africa Navigating the Ecosystem

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Innovations in Healthcare is a leading global network supporting the scaling and adaptation of promising healthcare innovations worldwide. The organization helps to improve healthcare and advance health by sourcing, strengthening, scaling, and studying the best healthcare innovations globally. Co-founded by the World Economic Forum, McKinsey & Company, and Duke Health in 2011, it operates as a nonprofit organization hosted by Duke in North Carolina, USA. Between 2011 and 2016, it has developed a network of 67 leading healthcare innovators working in 49 countries, serving over 10 million people annually, and continues to grow its networks and offerings.

More information is available at:
innovationsinhealthcare.org

The Center for the Advancement of Social Entrepreneurship (CASE) is an award-winning research and education center based at Duke University's Fuqua School of Business. CASE's mission is to prepare leaders and organizations with the business skills needed to achieve lasting social change. For over 15 years, CASE has been recognized as a leader in the field of social entrepreneurship and impact investing education, and has a global reach with MBA student and practitioner programming, research, and thought leadership.

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www.caseatduke.org.**

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I. Executive Summary

Innovations in Healthcare and the Center for the Advancement of Social Entrepreneurship are partners on the USAID-funded Social Entrepreneurship Accelerator at Duke (SEAD), which brings together interdisciplinary partners through a coordinated effort across Duke University. Across East Africa, investors, health system leaders, innovation accelerators, governments, and multinational corporations seek to identify and evaluate novel approaches to affordable, quality healthcare. Leveraging institutional relationships and networks across the globe, SEAD helps to create an integrated global health social entrepreneurship hub for diverse stakeholders.

The SEAD project team started this work to identify clusters of innovations emerging in the East Africa region. Noting the growing interest from multiple stakeholders, the team decided to study and analyze those clusters to understand better trends in the region along with specific ecosystem characteristics that promote or hinder the development and scale of healthcare innovation. This ecosystem analysis includes interviews with key stakeholders from Kenya, Uganda, and Rwanda. While interviewees often represent country-specific viewpoints, a number of perspectives also represent the wider five-country region, including Tanzania and Burundi, and can be applied more broadly across the region.

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WE BEGAN THIS EFFORT IN 2014, IDENTIFYING OVER SIXTY KEY INFORMANTS FROM THE FOLLOWING STAKEHOLDER GROUPS:

- » **Healthcare innovators** (care delivery, financing, training, technology and systems support)
- » **Funders** (investors, grant-makers, donors)
- » **Academic institutions**
- » **Public sector** (local and national)
- » **Private sector** (health and technology)
- » **Business development network organizations**
- » **Technical assistance providers**



Being effective at what we're doing - which is setting up a social enterprise - has got to do with being ready to persist and being ready to wait for returns later.



A NUMBER OF COUNTRY- AND REGIONAL-LEVEL THEMES ARE EXPLORED IN DETAIL IN THE FOLLOWING PAGES, INCLUDING:

- » **THE ROLE OF THE PUBLIC AND PRIVATE SECTORS:** Kenya and Uganda's strong private sectors are spurring innovation. Rwanda's strong public sector is resulting in increased investments in health, technology and the regulatory environment.
- » **HEALTH FINANCING:** In Kenya and Uganda, public and private sector financing solutions have yet to reach the mass market. In Rwanda, financing is almost entirely through the public sector.
- » **INNOVATION ENVIRONMENT AND SUPPORT SYSTEMS:** Kenya has a vibrant ecosystem for healthcare innovation while Uganda's is at an earlier stage. Innovations in Rwanda are focused on improving the existing public sector infrastructure.



WE ALSO INVESTIGATE THREE MAIN INNOVATION TRENDS IN THE REGION:

- » **CREATING PATIENT AND PROVIDER NETWORKS:** Healthcare innovators in East Africa are aggregating patients and providers into networks to create economies of scale that allow them to lower costs and increase access to care for patient populations.
- » **IMPROVING QUALITY OF CARE:** In addition to quality improvement measures being implemented through wholly-owned and aggregated provider networks, there are a number of standalone innovators providing quality improvement models and systems to providers.
- » **DEVELOPING TECHNOLOGIES THAT IMPROVE EFFICIENCY AND FINANCIAL SUSTAINABILITY:** Healthcare technologies are emerging as a key enabler of care delivery in the region. There is an increasing number of health technologies meant to improve efficiency and financial sustainability along the healthcare value chain. However, it remains a challenge for earlier stage, for-profit health technology companies to find the right customer, a challenge that threatens sustainability.

FINALLY, WE OFFER A NUMBER OF IMPLICATIONS OF OUR FINDINGS, INCLUDING:

- » The East African region is a high potential healthcare innovation market with numerous growth opportunities
- » Understanding market context is key to unlocking the value that exists in the East African healthcare market
- » Closer collaboration among actors and institutions in East Africa's healthcare innovation ecosystem gain from focusing collectively on better alignment of resources and increased connection points
- » Innovation requires innovative funding
- » High-value partnerships with the public sector are a pathway to scaling healthcare innovation in East Africa
- » There is a need to design new engagement models for private-private partnerships that mutually benefit growth-stage enterprises and corporations
- » The digital health space in East Africa has numerous niche opportunities that require connecting the dots between health and technology innovation clusters
- » With the healthcare innovation ecosystem set to grow, there is a need for investment in research and knowledge creation through academic and commercial research centers

A woman with her hair styled in braids, wearing a red top and a black and white striped blazer, is engaged in a conversation with a man whose back is to the camera. She is wearing a pearl necklace and has a name tag on her chest. The background is a blurred indoor setting with other people, suggesting a professional networking event.

**12 OF THE 25
SEAD
HEALTHCARE
SOCIAL
VENTURES
OPERATE IN
EAST AFRICA**

II. Introduction

The pace of change in our young century can seem dizzying as technology connects countries, regions and villages in closer and more meaningful ways. Mapping these connections and understanding expanding ecosystems is challenging and the healthcare space is especially difficult to navigate as it involves a broad range of professions, communities, and cultures. While many of the healthcare challenges from the last century – infectious diseases and maternal and child mortality – have seen some improvement, they are not yet fully addressed. Concurrently, rates of non-communicable diseases (NCDs) are on the rise in Nairobi just as they are in Mumbai and New York.

It is no secret that vibrant start-up cultures throughout East Africa are solving real problems in clever ways. How to grow that entrepreneurship into improved healthcare outcomes is a challenge that many leaders both inside of East Africa and outside of the region are facing. Recognizing the burgeoning entrepreneurial healthcare ecosystem in East Africa, and building on learnings from Duke University's SEAD program, the SEAD team opened an East Africa regional office in Nairobi, Kenya in January 2015 with the support of the USAID Kenya and East Africa Mission. The objective of SEAD's regional presence is to deepen engagement with East Africa-based healthcare innovators and to support the healthcare innovation ecosystem in the region.

In tandem, SEAD launched a research effort to gain a better understanding of the healthcare innovation ecosystem in East Africa, its players, gaps and opportunities. The findings here are intended to help key stakeholders identify and deploy resources more appropriately and interact more effectively to grow promising healthcare innovations in the region. Insights from this research effort were also used to inform the SEAD East Africa engagement with stakeholders and the support provided in the region to healthcare innovators.

This paper summarizes the wisdom of over sixty stakeholders in East Africa and analyzes the opportunities and gaps in the healthcare innovation ecosystem, spotlighting examples of innovation in the region. It looks at country and regional healthcare trends as well as the conditions for the healthcare entrepreneurial environment. It then examines the mechanisms for supporting and growing innovation and offers suggestions on how diverse stakeholders in the region can work together to navigate connections and chart a course toward improved health outcomes.



III. Methodology

Healthcare innovators face many critical external and internal challenges to growth. When resources are deployed appropriately and partnerships are formed across a larger healthcare ecosystem, overcoming these challenges is made easier. Key stakeholders from Kenya, Uganda, and Rwanda shared their insights, and while these stakeholders often represent country-specific viewpoints, a number of perspectives also represent the wider region, including Tanzania and Burundi, and can be applied more broadly.

Sixty key informants and stakeholders in the healthcare innovation ecosystem informed this report, including public and private sector players, investors, grant-makers and donors, academic institutions, technology sector players, and network and support organizations in health and social enterprise. Semi-structured Interviews were conducted over a period of nine months in Kenya, Uganda, and Rwanda. Additional insights were generated, leveraging data from market scans conducted by Innovations in Healthcare in 2014 and 2015. Market scans were undertaken through a call for applications to the Innovations in Healthcare Network and an analysis of the business models and service offerings of East Africa-based organizations that applied to join the Network.

With technology innovation so ingrained in the region, we examined levels of engagement of technology innovators and startups in the health sector. We talked to key influencers within technology communities, technology incubators, technology startups and academic institutions with a focus on Information, Communications and Technology (ICT) training. The three focus countries were chosen based on several factors, including the high number of health innovators identified (Kenya), high number of startups across diverse sectors (Uganda) and policy support for entrepreneurial development (Rwanda). Additionally, Kenya has the highest number of SEAD innovators operating in the region and the East Africa regional office is based in Nairobi. While these countries are not entirely representative, insights can be applied to other countries in East Africa.

Upon completing the first round of interviews, the SEAD East Africa team tested initial findings about emerging trends and mechanisms for strengthening the healthcare innovation ecosystem during three curated events that engaged over 230 stakeholders around specific findings. The insights drawn from these forums also inform this analysis.



For the purposes of this paper, the term “healthcare innovation ecosystem” describes participants and resources that contribute to sustainable innovation in the healthcare sector.

Innovations in Healthcare uses the term “healthcare innovation” to characterize inventive models of care delivery. These can include financing, systems support, products/technology, or workforce training mechanisms that create dramatic improvements in healthcare access, affordability, and/or quality, often advancing progress across all three dimensions. In turn, SEAD has worked to identify models that are sustainable, scalable (can grow within their original target market), and replicable (can be exported and adapted to additional markets). The healthcare innovators in the Innovations in Healthcare Network are found primarily in the private sector, target low-income or base-of-the-pyramid markets, and often have a social mission. The nonprofit and for-profit innovators in the SEAD program represent a subset of the larger Innovations in Healthcare network, selected for their mission to address low- and middle-income populations, their focus on primary care, maternal health, and/or non-communicable diseases, and their geographic focus in East Africa and India.



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THE PARTICIPANTS OF THE EAST AFRICA HEALTHCARE INNOVATION ECOSYSTEM CAN BE SORTED INTO THE FOLLOWING STAKEHOLDER GROUPS:

- » **HEALTHCARE INNOVATORS**
Organizations that provide care delivery, financing, training, technology, and systems support
- » **FUNDERS**
Investors, grant-makers, bilateral and multilateral donors
- » **ACADEMIC INSTITUTIONS**
- » **PUBLIC SECTOR**
Local and national levels, encompassing policy-makers, regulators and public sector providers
- » **PRIVATE SECTOR COMPANIES**
Health and technology
- » **CAPACITY DEVELOPMENT ORGANIZATIONS AND OTHER TECHNICAL ASSISTANCE PROVIDERS**
i.e.: organizations that provide technical support or advisory services to innovators

IV. Findings: REGIONAL AND COUNTRY TRENDS

Macro-economic and disease trends are influencing the growth and development of the healthcare sector in East Africa. Three of the biggest challenges placing increased pressure on health systems are:

- » **The double burden of communicable and non-communicable diseases**
- » **The current state of healthcare financing**
- » **The geographic maldistribution of healthcare providers**

Across East Africa the role of the private sector in healthcare is growing and leaders in multiple sectors are organizing diverse players across the ecosystem to grow innovative solutions and impact health outcomes. The private sector, made up of both for-profit and not-for-profit organizations, is engaged across the healthcare value chain with significant investments made in care delivery – from primary healthcare services to advanced care in large tertiary hospitals. The dynamic and fast-growing social enterprise space is paying increased attention – and putting more money and talent – toward the idea that growing good ideas in the health sector can have positive social impact.

Private sector growth is driven by an increase in population, rising incomes, and, to a smaller extent, private insurance. The five East African countries (Kenya, Tanzania, Uganda, Burundi and Rwanda) currently have a combined population of 153 million. By 2030, East Africans are projected to increase to 237 million people. Over half (178 million) will be children and youth. The private sector serves patients across diverse income groups with more than 40% of those in the lowest economic quintile in Kenya and Uganda receiving health care from private, for-profit providers. While public sector providers are generally widely distributed, patients often express a preference for private sector services, largely due to a perceived sense of higher quality compared to the public sector on metrics such as cleanliness, convenience, wait times, and friendliness. Other factors influencing choice of private healthcare services include: greater accessibility; flexible payment plans; continuity of care; availability of physician providers; and pharmaceutical supplies. Over 40% of East Africans pay for healthcare out-of-pocket with 2013 percentages varying from 75.6% in Kenya to 44.6% in Rwanda. A small segment of East Africa's population is covered by private health insurance schemes; the cost of premiums remain out of reach for the majority of people. Data from the WHO/World Bank shows that private prepaid plans as a percentage of total private expenditure on health range from as low as 0.3% in Uganda to 9.3% in Kenya. All of these factors have resulted in a sizable and growing private healthcare market in East Africa.

Private sector players are organizing across the region for growth and impact. Each country has a private health sector organization, labeled a federation, which brings together prominent private health sector players and advocates for the growth and continued leverage of the private health sector. In 2012 these federations came together to form the East Africa Healthcare Federation, a regional organization that plays a similar role to country-level federations, and also addresses regional level barriers to continued growth and impact of the private healthcare sector.

Research results brought focus to two important and overarching regional barriers:

» **HEALTHCARE FINANCING AND THE GEOGRAPHIC DISTRIBUTION OF HEALTH EXPERTISE IN EAST AFRICA ARE BARRIERS TO SCALE.**

Scaling improved healthcare throughout the region is inhibited by financing and maldistribution of services. The current financing mechanisms in most East African countries are fragmented, with most governments (with the exception of Rwanda) spending less on their health budget than the World Health Organization (WHO) recommended 11% of total government expenditures. Private health insurance coverage is rare. Sustained growth of the healthcare market is also inhibited by the geographic maldistribution of health services and health expertise; secondary and tertiary facilities and specialized care are offered primarily in urban areas.

» **EAST AFRICA CONTINUES TO FACE A DOUBLE BURDEN OF COMMUNICABLE AND NON-COMMUNICABLE DISEASES (NCDs), PLACING INCREASING PRESSURE ON HEALTH SYSTEMS.**

Twenty-five percent of deaths in Africa are due to NCDs with a majority of these deaths occurring in people younger than 70 years of age. East Africa mirrors this trend with NCDs accounting for a third of the burden of disease. For example, 50% of all hospital admissions and deaths in Kenya are NCD-related. It is projected that, by 2030, NCDs will be the leading cause of death in Africa, with the majority of these deaths occurring among those under 70 years old. A largely youthful population that is living longer and moving into urban areas, coupled with more complex disease patterns, presents both an opportunity and risk for the socioeconomic development of the region. While most resources continue to flow toward legacy causes of disease and death, such as maternal and child health conditions and HIV/AIDS, there are increased interest, time, and resources focused on preparing for the future burden of NCDs.



Country-level political and sector trends have implications for how the health sector will grow and develop across the region. Important are the following categories: role of the public and private sectors, health financing, and the entrepreneurial environments and support systems necessary for ecosystem development. Table 1 describes some important ecosystem trends.

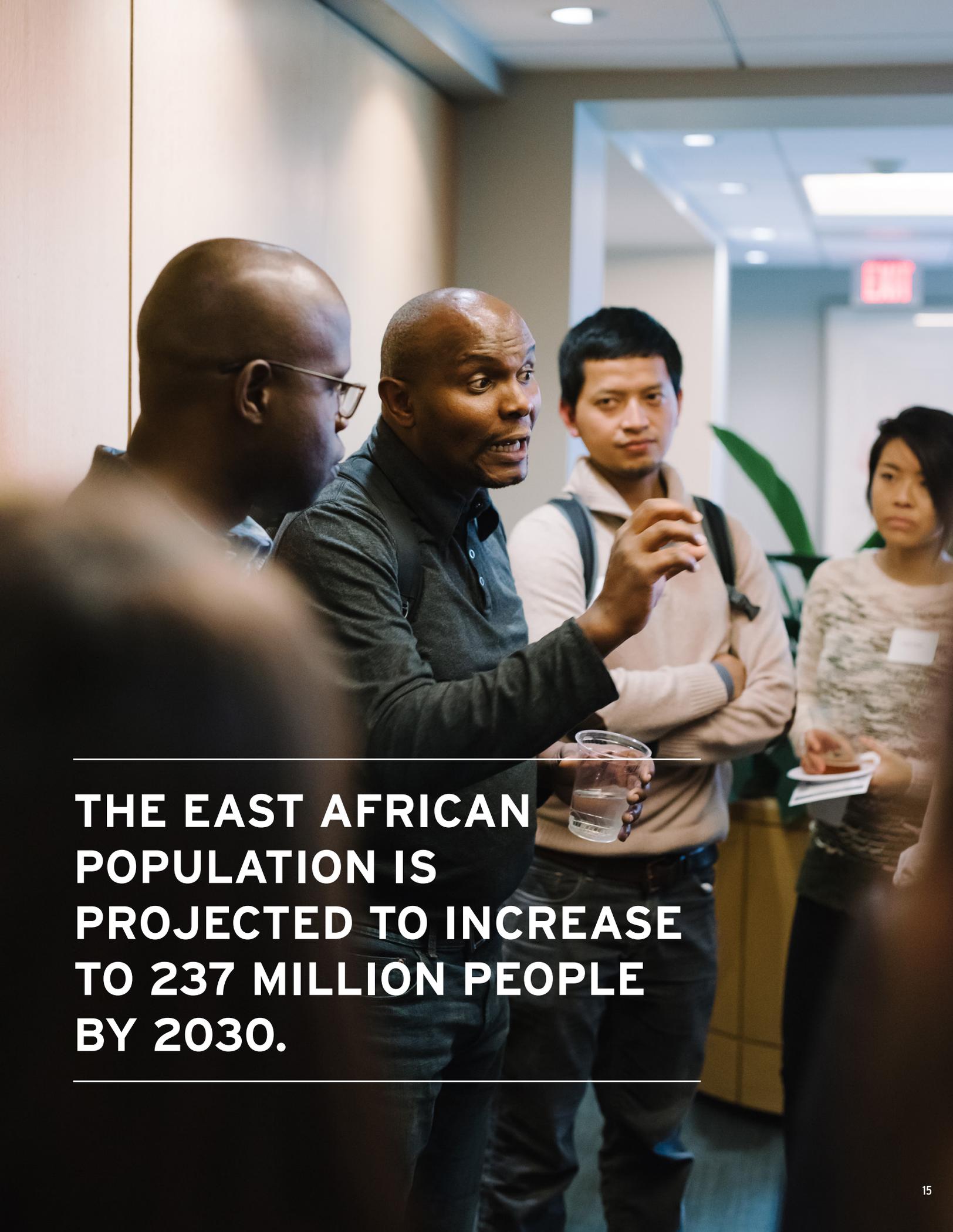
TABLE 1: IMPORTANT ECOSYSTEM TRENDS

TREND	KENYA	RWANDA	UGANDA
Role of the public and private sectors	Private sector plays a dominant and growing role in the health system	Large public sector investments in health, technology and the regulatory environment	Prominent private sector with traditional development organizations focused on disease programs
Health financing	Financing solutions in the public and private health sectors have yet to reach the mass market	High levels of coverage through public sector health financing options	Financing solutions in the public and private health sectors have yet to reach the mass market
Entrepreneurial environment and support systems	The ecosystem is vibrant but could be improved through increased coordination	Innovators work with the government to improve the existing health infrastructure	Innovations are earlier stage and there is increasing interest in the health sector

TABLE 2: ECOSYSTEM TRENDS BY COUNTRY

Within each country, notable ecosystem trends display the interaction between innovators, development organizations and the public and private health sectors. Table 2, below, summarizes these trends.

KENYA TRENDS	RWANDA TRENDS	UGANDA TRENDS
<p>Innovative organizations solving for poor maternal and child health outcomes continue to receive attention and resources</p> <p>Even with increased attention and activity among innovators, financing solutions in the public and private health sectors have yet to reach the mass market</p> <p>There is an increasing appetite to partner to solve system problems across public, private, donor, and academic organizations</p>	<p>Large public sector investments in health, technology and the regulatory environment have created a strong health infrastructure</p> <p>Innovative organizations are learning how to work with the Rwanda government to continue making improvements within the existing health infrastructure</p>	<p>Social enterprises concentrating on health tend to be earlier-stage than in other East African countries</p> <p>Traditional development organizations are thinking about how to increase their impact and become sustainable by deploying innovative ideas</p> <p>Innovation hubs are increasingly interested in working in the health sector with several early-stage organizations showing promise</p>



**THE EAST AFRICAN
POPULATION IS
PROJECTED TO INCREASE
TO 237 MILLION PEOPLE
BY 2030.**

V. Findings: INNOVATION TRENDS

Innovators in this region tend to be early-stage organizations focused on building networks, improving quality of care, or developing technologies that enable efficiency and sustainability. As early-stage organizations, many are ready for growth, though are not yet poised for scale.

Currently, the majority of healthcare innovators our research identified in East Africa are past the pilot stage, meaning they have a proven solution or strong theory of change on which they have built their solution. But few have a robust organizational structure for growth or a system ready to be scaled. For those that do have robust organizational structures and systems, few have worked through a pilot or test of their scaling strategy to make refinements so that, when resources and capacity become available for scale-up, all the necessary design, planning, and preparatory learning processes will have taken place.

We also found that the majority of healthcare innovators in East Africa are focused on building for-profit models compared to not-for-profit organizations, public sector entities, or faith-based institutions. This finding could be influenced by the networks from which Innovations in Healthcare and SEAD source healthcare innovators (for example, investors as well as funding organizations) but could also be indicative of other health market trends in the region, such as increased market opportunity and growing interest among funders and the not-for-profit sector to find market-based solutions to healthcare challenges.

East Africa, and particularly Nairobi, Kenya, is a growing hub for Information and Communications Technology (ICT) innovation, and ICT innovations are being designed specifically for the healthcare sector. Given the quick and strong development of the ICT sector in the region, our research anticipates ICTs continuing to be fundamental to a large proportion of emerging innovative healthcare organizations. For ICT-focused companies to succeed, they will need to be incorporated into existing systems and prove that revenue can be generated from the value they create.

Our stakeholder interviews and ecosystem analysis revealed three main healthcare innovation trends in the region:

» **CREATING PATIENT AND PROVIDER NETWORKS**

Healthcare innovators in East Africa are aggregating patients and providers into networks to create economies of scale that allow them to lower costs and increase access to care for patient populations.

» **IMPROVING QUALITY OF CARE**

In addition to quality improvement measures being implemented through wholly-owned and aggregated provider networks, there are a number of standalone innovators providing quality improvement models and systems to providers.

» **DEVELOPING TECHNOLOGIES THAT IMPROVE EFFICIENCY AND FINANCIAL SUSTAINABILITY**

Healthcare technologies are emerging as a key enabler of care delivery in the region, particularly technologies to improve efficiency and financial sustainability along the healthcare value chain. However, it remains a challenge for earlier stage, for-profit health technology companies to target and reach the right customer segment, a challenge that threatens sustainability.

The table below summarizes these trends and provides examples of innovator solutions.

TABLE 3: DESCRIPTION OF INNOVATION TRENDS WITH EXAMPLES

INNOVATION TREND	DESCRIPTION	EXAMPLES OF INNOVATOR SOLUTIONS
Creating patient and provider networks	Healthcare innovators in East Africa are aggregating the supply of health services into networks to create economies of scale that allow lowered costs and increased access to care populations.	<ul style="list-style-type: none"> - LiveWell Health Clinics - World Health Partners - Afya Research Africa - PharmAccess
Improving Quality of Care	In addition to quality improvement measures being implemented through wholly-owned and aggregated provider networks, there are a number of standalone innovators providing quality improvement models and systems to providers.	<ul style="list-style-type: none"> - PharmAccess - LifeNet - Health Builders
Developing technologies that improve efficiency and financial sustainability	Healthcare technologies are emerging as a key enabler of care delivery in the region. There are increasing numbers of health technologies meant to improve efficiency and financial sustainability along the healthcare value chain.	<ul style="list-style-type: none"> - MicroClinic Technologies - access.mobile - Toto Health



WE EXPLORE EACH OF THESE INNOVATION TRENDS IN MORE DETAIL IN THE FOLLOWING SECTION, LAYING THE GROUNDWORK TO ASSESS HEALTHCARE MARKET OPPORTUNITIES FOR INNOVATION.

A

CREATING PATIENT AND PROVIDER NETWORKS

Healthcare innovators in East Africa are aggregating patients and providers into networks to create economies of scale that allow lowered costs and increase access to quality care. New care delivery organizations are working to make private primary care more affordable and accessible for low-income populations in urban centers. These organizations adopted models characterized by full ownership of the medical centers and achieved growth by increasing the number of patients served at each care delivery location and/or the number of locations. These networks serve as a proof-of-concept for delivering low-cost, high-quality care to low-income populations. Close monitoring and use of direct quality improvement measures in a controlled and standardized way were key to proving this concept.

While many of these wholly-owned networks are still seeking rapid expansion through an influx of growth capital, some are looking to use their influence to create system-wide change in both public and private health systems. Having proved that provision of low-cost, high-quality care is sustainable, a number of care-provider networks are seeking to share their model with others who could benefit from it. One model being used involves embedding pieces of the model into the public health system to drive costs down and drive quality up, thereby increasing access to care for patient populations. The spotlight below describes one such case.

SPOTLIGHT: Jacaranda Health

Through recent policy changes in Kenya, pregnancy delivery costs for public and some private providers are now covered by the National Health Insurance Fund, making this care free or nearly free for most Kenyans -- and facility-based deliveries are rising. Despite this trend, maternal and infant mortality remain high because quality of care is still a challenge. Women often experience overcrowded or unsanitary facilities, disrespectful care, and serious performance gaps in emergency obstetric care.



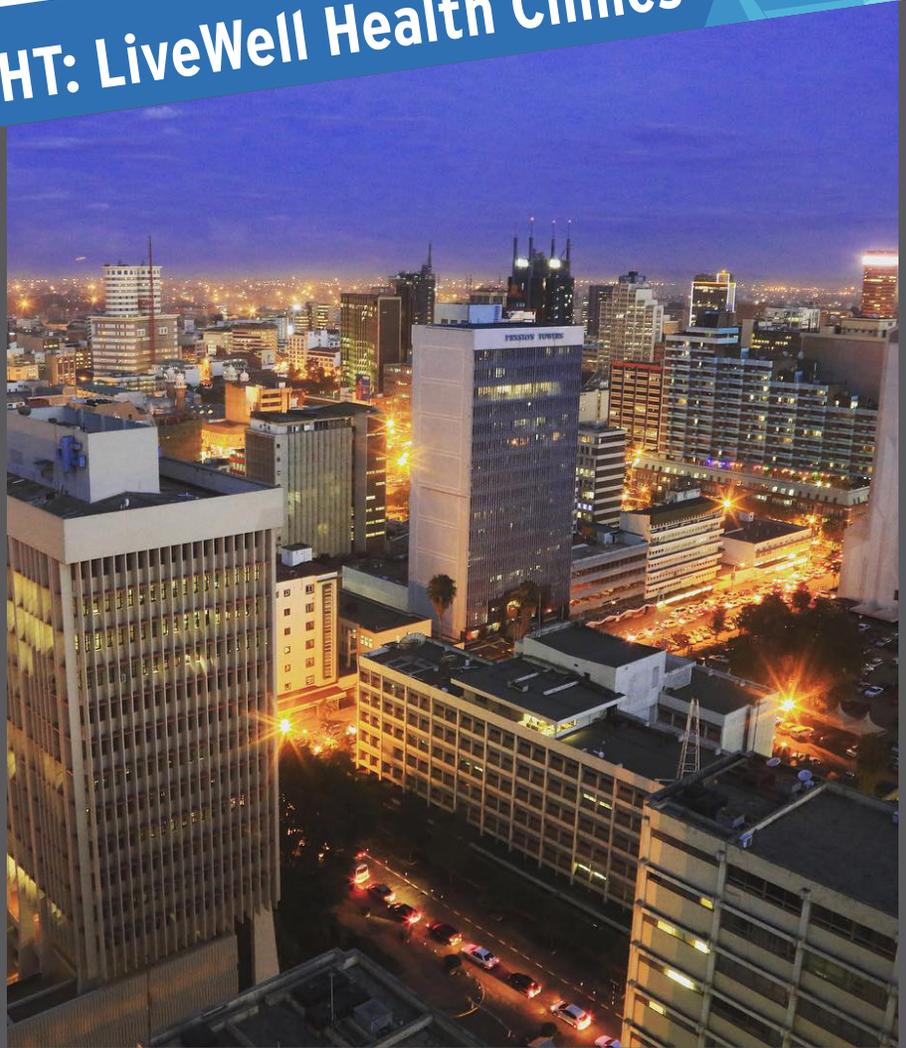
Jacaranda Health is proving that respectful, high-quality care can also be affordable and is helping to replicate their model in both the private and public sector. Jacaranda currently operates two maternity hospitals that use evidence-based practices and patient-centered design to provide maternal care and delivery services for less than USD\$100 per birth. Their hospitals function as a test lab of sorts, where they implement and test innovative processes and models to drive costs down and improve quality. Jacaranda Health then trains other clinics and hospitals in these proven methods in an effort to change the way maternity care is provided throughout Kenya.

Other healthcare innovators in the region are building upon such models as Jacaranda Health, using economies of scale to lower costs and improve access to quality care. Innovative care delivery organizations are aggregating networks of existing care providers, using standardized provider management and care processes and deploying technologies to affect cost, quality, and access to care. By deploying management methods to scaling care delivery, these healthcare innovators are taking advantage of the breadth of existing primary healthcare providers in the region to improve care delivery and reach more patients faster. This new method of scaling primary healthcare across the region results in greater demand to implement better provider management and care processes, as well as technologies suited to address the specific challenges confronting healthcare providers.

When implementing improved provider management, care processes, and technologies, these aggregator organizations are challenged to align their offerings with the realities of providers in the region, align provider incentives with their goals, and maintain a high level of quality in the care being delivered to patients. The spotlight below offers one example of an aggregated network.

SPOTLIGHT: LiveWell Health Clinics

In Nairobi, LiveWell Health Clinics provide primary care to urban, low-income communities by partnering with independently-owned clinics to create a hub-and-spoke model. Satellite clinics run by nurses offer basic primary care and lower-level urgent care, and can refer patients to larger clinics offering additional specialty physician care as well as laboratory tests. LiveWell Health Clinics provides startup capital to healthcare providers to open clinics. This loan is paid back over a five-year term, during which time clinic owners also receive LiveWell Clinic branding and back-office support services, such as claims processing, training, and supply chain consolidation.



After the first five years, clinic owners can remain in the LiveWell Health Clinics network and continue to receive the back-office support for an annual fee. The model is designed to increase efficiency of clinic operations and provide timely referrals for higher-level care.

B

CREATING PATIENT AND PROVIDER NETWORKS

Quality improvement, certification and accreditation programs for basic primary care providers are also being deployed throughout the region. By linking these accreditation programs with access to financial credit, there has been success in creating incentives for care providers participate. However, consumers do not always recognize the value of these quality accreditation measures, making these programs less than desirable for those clinics that do not need access to credit.

Other healthcare innovators are taking a more hands-on approach to quality improvement and growth financing by working alongside existing care providers, sharing relevant clinic management and care provision processes to improve the sustainability and quality of care. These healthcare innovators often structure this sharing into a standardized training curriculum and rely heavily on quickly proving the value of this training for measures that providers care about, such as revenue, patient visits, and patient retention. The spotlight below is one example of successfully equipping health centers within a franchise model focused on growth financing and improving quality of care.

SPOTLIGHT: LifeNet International

LifeNet International integrates existing healthcare providers into a franchised network to improve quality of care. Working in Burundi, Uganda and the Democratic Republic of the Congo, LifeNet International partners with church-based health centers that have strong community reputations and provides the selected franchisees with three benefits:

- 1) standardized training for staff;
- 2) pharmaceutical supply delivery;
- 3) growth financing.

The LifeNet International training curriculum is adapted to the unique context and needs of each country and includes units on evidence-



based clinical practices as well as financial management skills. Franchisees who successfully participate in training and meet certain quality indicators can order pharmaceutical supplies through the franchise and can also access favorably-structured financing to purchase new equipment or expand operations. The LifeNet International model is designed to fill critical gaps in continuing medical education and growth financing among small clinics serving low-income populations.



DEVELOPING TECHNOLOGIES THAT IMPROVE EFFICIENCY AND FINANCIAL SUSTAINABILITY

A number of new healthcare technologies hold the potential to drive efficiencies and improve care delivery processes by plugging into all parts of the healthcare value chain, including drug procurement and patient engagement. However, it remains a challenge for earlier-stage, for-profit health technology companies to find the right clinic customers – a challenge that threatens the long-term sustainability of these solutions. The spotlight below demonstrates the use of technology to improve the business of providing healthcare, including patient engagement.

SPOTLIGHT: MicroClinic Technologies

Rural clinics provide much of the healthcare in Kenya as some 80% of the population reside in rural areas. Many of these clinics face significant challenges to efficiency, due in part to an inability to track inventory and poor management of patient volume. MicroClinic Technologies developed the ZiDi™ application to help clinics address these issues. This application includes an electronic medical record system and tracks patient encounters, collected revenues, drug inventories, staff productivity and service utilization rates in real time.



ZiDi™ is designed to drive efficiency by reducing the burden of administrative duties and enabling automatic and accurate tracking and reporting of critical clinic and supply chain data. The application is sold to private and public clinics as a prepaid service. MicroClinic Technologies provides technical assistance to its clinic customers.

VI. Findings:

HEALTHCARE MARKET OPPORTUNITIES

Untapped opportunities exist in certain market segments; areas where, despite existing or latent demand for services, there are few innovative models operating at scale to meet the demand. Table 4, below, summarizes key market opportunities, which are then discussed in more detail in the following pages.

Healthcare market opportunities with high growth and impact potential include:

TABLE 4: MARKET OPPORTUNITIES

MARKET OPPORTUNITIES	EXAMPLES OF SOLUTIONS*
Financing solutions for the mass market	MicroEnsure Afya Poa
Prioritizing patient engagement and experience	access.mobile
Non-communicable disease management models	Afya Research Africa Primary Care International
Contextually appropriate and affordable diagnostics	MobileODT Matibabu

**LINDA JAMII HAD REACHED
80,000 CUSTOMERS,
MOSTLY THROUGH
EMPLOYEE-SPONSORED
SCHEMES.**





FINANCING SOLUTIONS FOR THE MASS MARKET

Almost 90% of Kenyans lack any form of health insurance and the picture is similar in Uganda. A health financing solution for the mass market has yet to scale in the region, though demand among private sector healthcare patients and providers for such a product continues to grow. This is a challenge for healthcare innovators as well as larger, established companies and governments. A number of healthcare innovators have designed and launched healthcare financing products and still no solution has reached significant scale. Low- and middle-income populations prefer access to credit for outpatient care rather than saving and paying for insurance coverage. Also, sales channels still fail to reach the most vulnerable populations. Public sector financing options have very low uptake, often fail to provide high quality coverage and face a number of barriers to use that prevent customers from reaping benefits that are available.

Overcoming these challenges to scale requires a private sector financing solution for the mass market that take careful consideration of the drivers behind health financing preferences in target populations and the identification and use of cost-effective sales channels. The spotlight below provides insights into the success and failure of a working model for families to finance their healthcare.

SPOTLIGHT: Changamka Microhealth Ltd.

Bringing customer preferences and strong sales channels to the forefront of the health financing conversation, Changamka Microhealth Ltd. developed a family-focused healthcare financing model. For the equivalent of USD\$120 per year, Changamka's product, Linda Jamii, provided families in Kenya the following benefits: medical (outpatient and inpatient) coverage, funeral expense coverage, and hospital cash. These benefits became available after the customer paid USD\$60 for six months of coverage and persisted as long as the customer was able to continue saving for and making payments against the annual premium every six months. Customer preferences and compelling sales channels were both key drivers in making the launch of this product a success.

But after launching in early 2014, Linda Jamii was discontinued at the end of September 2015 – in that time, Linda Jamii had reached about 80,000 customers, the majority being through employee-sponsored health financing schemes. This was not the vision Changamka had when designing the product. First, customers were not compelled enough to save for healthcare. Changamka found that many would sign up for Linda Jamii but few would be converted into ongoing paying customers. This seemed to reflect a preference to receive credit for actual healthcare expenses incurred, over paying in advance for protection for a healthcare expense that might not be needed. Second, the sales channel for Linda Jamii failed to reach the targeted, hard-to-reach population. While Changamka partnered with Safaricom, Kenya's largest telecommunications provider, to sell Linda Jamii through Safaricom vendors, the conversion of those clients into self-paying, long-term Linda Jamii customers was not successful.

B

PRIORITIZING PATIENT ENGAGEMENT AND EXPERIENCE

Existing healthcare innovations are largely built on solutions for providers like training, improved payment models, or process improvements. Solutions for patients – such as patient engagement and experience management, education, and embedding solutions into the daily life or into a community of patients—are not yet as prominent in the region. Such innovations could improve health outcomes through better interactions between consumers and their providers.

Designing technology for patient engagement and experience has traditionally been a lower priority for healthcare innovators in the region due to the volume of work needed simply to make care accessible to those that need it. However, more healthcare innovators are recognizing that managing for patient engagement and experience is essential to the sustainability of their model because it drives patient satisfaction, patient returns and referrals, health outcomes, and ultimately revenue. The spotlight below shows a successful model to help patients understand their options and facilitate communication with their healthcare providers.

SPOTLIGHT: [access.mobile](#)

access.mobile is a digital health company operating in Uganda, Kenya, Nigeria, and Ghana. Its motto: “Simple, Affordable, Usable” describes its initial product, amHealth, which digitizes patient records and offers a practice management and engagement platform that automates communication with patients via SMS, email, and smartphone notifications. Providers using the product find that it improves communication with their patients, and, as a result, patient retention and quality of care. As of 2016, amHealth served nearly 600 practitioners in reaching over 450,000 patients.

The innovation has helped clinicians process 29,000 patients visits to facilities, and in 2016, over 70,000 messages have been sent through the platform.



In June 2016, access.mobile launched its newest product – Gozee -- which allows patients to find local healthcare services online and request appointment bookings. Launching first in Uganda, the platform provides information on over 2,000 verified health facilities and pharmacies nationwide and enables patients to understand better their options and make informed decisions about the healthcare they seek. Together these technology solutions are making healthcare services more simple, affordable and usable for both patients and providers.



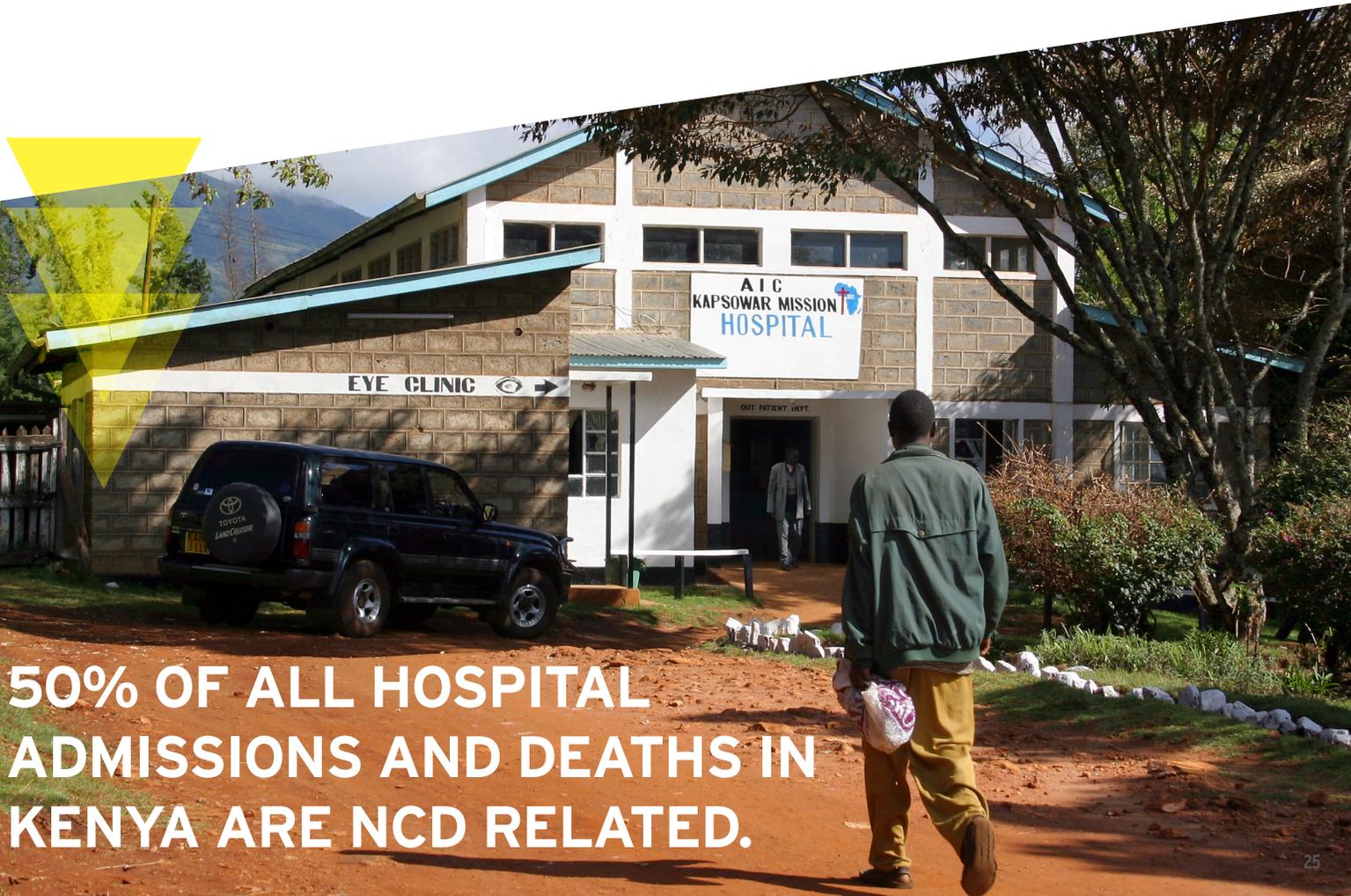
NON-COMMUNICABLE DISEASE (NCD) MANAGEMENT MODELS

More focus needs to be brought to health systems' response to and prevention of non-communicable diseases. Much of the current conversation centers on how to incorporate prevention, diagnosis, and management of NCDs into existing care delivery mechanisms. The most popular of these mechanisms focuses on patients' first touch-point into the health system, such as primary care facilities or pharmacies. Multiple stakeholders in NCD management models are showing increased interest, driving new solutions for existing and novel care-delivery mechanisms that provide important lessons about how to tackle the growing burden of NCDs in the region.



CONTEXTUALLY-APPROPRIATE AND AFFORDABLE DIAGNOSTICS

While public and private sector providers are keenly interested in accessible point-of-care diagnostics, affordable devices well-suited to the East Africa context are not common. While healthcare providers have a large number of products to choose from, few of those products are appropriate, functionally and financially, to the local contexts.



50% OF ALL HOSPITAL ADMISSIONS AND DEATHS IN KENYA ARE NCD RELATED.

VII. Mechanisms for Supporting Healthcare Innovators in East Africa

Better alignment of resources to address barriers to growth and facilitating mutually beneficial partnerships among stakeholders in the healthcare innovation ecosystem can help accelerate the proliferation and scale up of solutions in the health sector. Conversations with stakeholders in the healthcare innovation ecosystem revealed several ways to align resources with growth needs and create mutually beneficial partnerships. Mechanisms for supporting healthcare innovators in East Africa include:

- » **Define the growth stage of healthcare innovators, and focus different types of resources to address each stage of growth**
- » **Make growth capital more innovator-friendly**
- » **Understand how to engage the public sector**
- » **Strengthen partnerships within the private sector**
- » **Leverage connections between the technology and healthcare sectors**
- » **Increase knowledge-sharing among innovators and funders**

More detailed descriptions of each of the mechanisms for supporting the growth and proliferation of healthcare innovators in East Africa follow.



ALIGNING RESOURCES WITH THE GROWTH STAGE OF HEALTHCARE INNOVATORS

Healthcare innovators pass through different stages as they grow, and each stage has different needs. Supportive organizations in the healthcare innovation ecosystem in East Africa need to become more sophisticated in discerning and addressing the needs of organizations at different stages.

Supporters in the healthcare innovation ecosystem cite five key stages of growth for healthcare innovators in East Africa. The stages of growth are: 1) blueprint; 2) validation; 3) preparation for scale; 4) pilot scaling strategy; and 5) scale. These stages are similar for organizations in other sectors and represent a general trajectory of organizational growth and maturation. Across the five stages for growth there are varying levels of support available for healthcare innovators in the region. There is an opportunity to align resources with these stages in a more effective way. Table 5, below describes resources needed for each stage of growth and the current level of support available.

TABLE 5: STAGES OF GROWTH AND CURRENT SUPPORT AVAILABLE

STAGE OF GROWTH	DESCRIPTION	CURRENT LEVEL OF SUPPORT
Blueprint	An increasing number of opportunities are available for developing and piloting new ideas in the region. This is largely influenced by a vibrant social entrepreneurship dynamic and an inflow of resources from donors to support innovation and entrepreneurship.	High
Validation	Healthcare innovators' engagement in the validation stage are focused on business model proof-of-concept and customer validation around value and demand, in opportunistic, rather than strategic ways. There is a great opportunity here to advise healthcare innovators on how to go about this more strategically so that the resulting product or service is more in line with customer preferences and is thus more likely to scale and create impact in the long-term.	Low
Preparation for Scale	It is hard to find the tactical support and capacity to work through identifying the core elements of the innovation model, preparing to modularize and repeat these efficiently and thoroughly. While a number of consulting organizations exist that could advise on this process, the real barrier comes in getting healthcare innovators in the region to devote time and resources to this, due to competing internal and external demands placed on innovators.	Low
Pilot Scaling Strategy	<p>Piloting a scaling strategy involves choosing a path to scale that aligns with the end-goal of the organization, such as getting acquired or having someone else in the ecosystem take up the model. Different paths to scale correlate with different end-goals. During this stage healthcare innovators must ask:</p> <ul style="list-style-type: none"> • What is my organization's end-goal? • What path to scale do I need to execute to get there? • What tradeoffs between control and speed of scale am I willing to make? <p>Healthcare innovators in the region often skip this stage altogether because of external funding pressure to be "ready to scale." When funders do not require proof of a strategic growth plan that includes some experience and lessons learned from testing out a scaling strategy, healthcare innovators are tempted to jump straight to scale.</p>	Low
Scale	Fundors are interested in supporting healthcare innovators to scale. However, there is a mismatch between interest and innovators that are truly ready to scale; those that have executed the preparatory steps necessary for scale in a compelling and documented manner.	Medium



MAKING GROWTH CAPITAL MORE INNOVATOR-FRIENDLY

Though the landscape in East Africa comprises a variety of investors and funders offering multiple financial vehicles for placing capital, innovators face challenges acquiring capital regardless of their stage of development. Deploying early- and mid-stage growth capital (both grants and investments) allows innovators to learn, iterate and scale successfully, and can create greater long-term success. Our stakeholder research found increasing interest in the healthcare sector among investors of all types. For most, and particularly impact investors, the space is relatively new and there are limited funds focused solely on healthcare. It is important to build interest in this nascent space.

Where social enterprise ecosystems are less mature (e.g., Burundi) there are fewer examples of success and fewer opportunities for accessing funds through existing networks. In countries like Kenya, Uganda, Tanzania, and Rwanda, where social enterprise ecosystems are somewhat more developed, there are increased opportunities for accessing networks to find funding. Even in these settings though there are few examples of successful, high growth enterprises.

IN THEIR 2015 REPORT, #CLOSING THE GAP KENYA, INTELLECAP IDENTIFIED THE FOLLOWING GAPS IN GROWTH CAPITAL SUPPORT:

- » Risk-taking angel and seed investments that help high-growth startups grow their businesses
- » Patient growth capital that helps small and medium enterprises demonstrating moderate growth that do not qualify for pure-play equity
- » Affordable and relevant business support services that help small and medium enterprises grow and raise funding capital

Many impact investors placing capital in East Africa are headquartered in high-income countries and lack understanding of the market context – a critical ingredient for confident investing. This trend has started to shift as the numbers of East Africa-based investors placing capital increase. Notably, some investors are establishing their offices outside of Kenya to avoid what is perceived as a saturated market there and increasingly investors are seeking opportunities in Uganda and Tanzania.

As previously discussed, available capital is not always targeted to what innovators need. Innovators have identified gaps in their own knowledge about what is required for them to get ready for capital:

- » Innovators voiced uncertainty about the type and amount of capital required for growth, often because they had not yet outlined a strategic plan for growth
- » Even when an innovator does have a plan for growth, it can be difficult to identify and align appropriate capital with their stage of growth
- » Innovators are not well informed on how long it will take to raise capital and so get caught “short of cash”
- » Innovators often struggle to provide information requested by investors due to the differences in financial and business documentation needed by each

Activities to prepare healthcare innovators for capital are increasing in the region. Support for social entrepreneurs is available through more than forty organizations in East Africa (and most of these intermediaries are based in Kenya), including incubators/accelerators, consultants/technical assistance providers, investor networks, business plan competitions, and research support. Yet, impact investors cite gaps in the support available, and seek organizations that offer a pipeline of investment-ready innovators. Based on these findings, partners in the SEAD program are addressing some of the needs of support organizations in East Africa and beyond. A capacity-building competitive grant program matches innovator needs with local consultancy technical assistance. A series of online Smart Impact Capital tools, created in 2016, is designed to help innovators understand how to align their capital-raising strategies with capital providers and manage negotiations and relationships with investors.

Our stakeholder research indicates that funders should consider alternative funding mechanisms and structures to be more responsive to innovator needs. There is also opportunity for funders to work together to identify opportunities across the capital spectrum. Some frameworks for how funders can do this are documented in research conducted by Innovations in Healthcare, detailing innovator needs in Kenya, India and Mexico, and published as a white paper entitled, “Context is Key to Investing in Health Innovation: Perspectives from Health Entrepreneurs in India, Kenya, and Mexico.”

SPOTLIGHT: Smart Impact Capital

Smart Impact Capital™ addresses the needs and common pitfalls of impact entrepreneurs seeking to raise investment capital. Developed through collaboration with hundreds of investors and entrepreneurs, including SEAD’s East Africa Innovators, the nine modules take users through the process of preparing for and securing investment capital.

Learn more at:
casesmartimpact.com



UNDERSTANDING HOW TO ENGAGE WITH THE PUBLIC SECTOR

Understanding how to structure high-value partnerships with the public sector can open up a path to scale for healthcare innovators and multinational corporations, while making progress towards public sector goals. Our research showed that healthcare innovators engage the public sector across the region in three different ways. What follows is how innovators view and understand engagement with the public sector in their respective country contexts.

I think the most important lesson learned was that we thought that investors were all about profit or impact. But indeed, at the end of the day, we found that most investors wanted to see traction more than anything else.



Zach Oloo | CEO,
Changamka
Microhealth Ltd



RWANDA: “IN PARTNERSHIP WITH”

Large public sector investments in the healthcare infrastructure in Rwanda mean that healthcare innovators are structured to work in partnership with the public sector. Healthcare innovators must create a product or service that aligns with the governments’ interests and design a compelling way to integrate with work already underway.



KENYA: “WITH THE PERMISSION OF”

Kenya recently devolved their health system so that decision-making now sits at the county level, rather than at the national level. This has given healthcare innovators in the region the opportunity to engage more easily with the public sector. However, necessary frameworks for interaction between county level health management teams and healthcare innovators are not in place and many barriers to building valuable partnerships exist. Healthcare innovators are often required to get the permission of county-level governments to operate effectively. Even when the county government does want to partner, experience structuring and navigating a successful partnership is not plentiful, making successful examples hard to come by.



UGANDA: “IN LINE WITH”

Healthcare innovators in Uganda tend to align their organizational goals and activities with national government health priorities. This happens for a few key reasons. First, the national government health priorities dictate what gets funded. If an organization’s goals and activities align with these priorities, it’s more likely that they will get support from the government or external donors. Second, donor dollars flow through the government and are the primary capital source for healthcare innovators in the country, offering another incentive for healthcare innovators to align with national government priorities.

FINDINGS PROVIDE THE FOLLOWING KEY INSIGHTS FOR CREATING STRONGER PARTNERSHIPS WITH THE PUBLIC SECTOR

1 THERE IS A LEARNING CURVE

If public-private partnerships are in the interest of both private sector and public sector players, then it should not be left solely up to the public sector to figure out the way forward. The public and private sector would need to work together more closely to navigate a potential partnership.

2 INVEST IN PARTNERSHIP STRUCTURE

Clearly articulating the role of each partner upfront is critical and partners also need to be willing to revisit partnership agreements as the collaboration matures to ensure continuous mutual benefit.

3 BUILDING RELATIONSHIPS AND SHARING PERSPECTIVES

Partnerships can go a long way if both sides try to understand each other’s perspectives and if both partners have common objectives and a framework for engagement.

4 RECOGNIZE THAT PARTNERSHIPS ARE ABOUT MORE THAN MONEY

Knowledge transfer and capacity-building can be equally as valuable as monetary partnerships between the public and private health sector. Partners can remember this when negotiating partnership agreements and be willing to be creative about how partner organizations can provide value.



D STRENGTHENING PARTNERSHIPS WITHIN THE PRIVATE SECTOR

Structuring mutually beneficial partnerships between healthcare innovators and multinational corporations and/or other prominent private health sector players in the region can help innovators grow and ensure that the best ideas are being leveraged by those well positioned to impact the health of the population at scale.

Two types of private-private partnerships emerged in our conversations as relevant and potentially valuable for healthcare innovators in East Africa:

- 1) partnerships between healthcare innovators and multinational corporations; and
- 2) partnerships between healthcare innovators and prominent local or regional private health sector entities.

HEALTHCARE INNOVATORS AND MULTINATIONAL CORPORATIONS

Private-private partnerships between healthcare innovators and multinational corporations have garnered attention in recent years, though little has been documented about the successes and challenges of these partnerships. There is a natural complement between the contextual expertise of local healthcare innovators and the economic power and reach of multinational corporations to expand business offerings. This complementarity spurs the increase in support for private-private partnerships. Healthcare innovators see multinational corporations as an essential growth partner able to provide special access to products, services, expertise, and channels. Multinational corporations see healthcare innovators as market research and/or market entry partners with new and compelling business or customer engagement strategies that can help them build successful businesses in new markets. Many multinational corporations and healthcare innovators have forged partnerships. The dearth of explicit sharing about why the partnerships were formed, what worked well and what did not, and the future direction of such partnerships does inhibit healthcare innovators and multinationals from learning from others' experiences.

THE FOLLOWING ARE KEY INSIGHTS ABOUT CREATING PRIVATE-PRIVATE PARTNERSHIPS:

1

THE SIZE, STRUCTURE, AND DECISION-MAKING MECHANISMS IN MULTINATIONAL CORPORATIONS MAKE IT HARD FOR INNOVATORS TO CRAFT A COMPELLING PARTNERSHIP PITCH OR UNDERSTAND HOW TO MAINTAIN A LONG-TERM WORKING RELATIONSHIP WITH MULTINATIONAL CORPORATIONS.

Our research showed that many still seek the perfect (but elusive) private-private partnership with a multinational corporation. Many struggle to develop a compelling pitch while navigating the inherently complex and fast-changing motivations of multinational corporations. Even those healthcare innovators that have forged a partnership with a multinational corporation find it difficult to transition that partnership into a long-term working relationship where both parties benefit.

2

PRIVATE-PRIVATE PARTNERSHIPS GARNER CONTINUED INTEREST AND INVOLVEMENT AMONG MAJOR PRIVATE SECTOR PLAYERS IN SPURRING AND LEARNING FROM HEALTHCARE INNOVATION IN THE REGION.

Multinational corporations are becoming more intentional about how they choose to support healthcare innovators and some are beginning to test out new engagement models that are a better fit for their needs and interests, and align with the realities faced by healthcare innovators in the region.

These models highlight shared vision and values, building trust among the principals while maintaining flexibility, and casting wide to include all stakeholders in planning and executing the partnerships. Also important to note is a trend toward innovation ecosystem development – creative partnerships are engendering connections that are helping to shape the innovation ecosystem.

HEALTHCARE INNOVATORS AND PROMINENT PRIVATE HEALTH SECTOR PLAYERS IN THE REGION

The majority of prominent private health sector players in the region have yet to develop low-cost, high-volume models that help them reach poorer segments of the population. Opportunity awaits the private health sector player in East Africa that is able to effectively reach lower- and middle-income market segments. Currently, most prominent private health sector players have yet to attempt reaching these populations, and key informants suggested that this may be due to a simple information gap. If more private health sector players knew about and could get connected to healthcare innovators focused on low-cost, high-volume models of care delivery, technology, training, systems support, and financing, then they could learn from and potentially partner with these innovators to expand their own businesses.

There are examples of healthcare innovators supporting partnerships with prominent private health sector players to help improve innovator efficiency and care integration for their patients. The spotlight below describes one example.

A growing private health sector, particularly in Kenya, has brought about an interest among primary care providers to work with prominent private health sector players across the healthcare value chain to improve efficiency and improve care integration for their patients. Penda Health, a private for-profit chain of primary care clinics in Nairobi, Kenya, is just one example. Penda Health clinics order their drugs from local drug distributors. This process involves many steps:

- 1) manually tracking their drug inventory;
- 2) creating an order list;
- 3) calling in that order to the local drug distributor and reading it over the phone line by line;
- 4) visiting the drug distributor to ensure the order is correct;
- 5) and (even with all precautions taken) correcting mistakes on the order after it has been received.

Penda Health and many other private primary care providers would benefit from a local distributor that can meet their needs effectively and efficiently. On the other end of the spectrum, Penda Health aims to provide high quality care to their patients. However, as a primary care clinic there are higher-level clinical needs they cannot meet. For these higher-level clinical needs, patients from Penda Health clinics must seek care at secondary, and sometimes tertiary, facilities. In these cases Penda Health and their patients could benefit from a reliable, high-quality referral partner. In both cases, there is a clear market opportunity for partnerships between prominent private health sector players in the region which would provide mutual benefit.

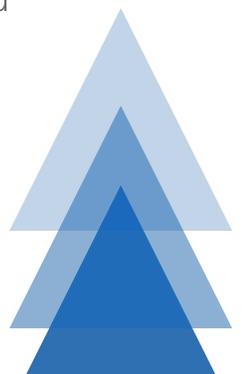


A LEVERAGING CONNECTIONS BETWEEN THE TECHNOLOGY AND HEALTHCARE SECTORS

Building connections between the healthcare and technology sectors could lead to faster growth and more efficient scaling of healthcare innovations across the region.

EAST AFRICA HAS BECOME SYNONYMOUS WITH A CULTURE OF TECHNOLOGY INNOVATION.

Consider the following three innovations that have shaped the region's reputation: a) the meteoric rise of mobile money; b) the real time digital mapping app, Ushahidi, which uses crowd-sourced information; and 3) the development of multiple, vibrant tech communities. Alongside this bubbling innovation energy, East African governments have invested significantly in broadband internet infrastructure since 2009. These investments help lower costs and increase access to fast, reliable internet connectivity to spur growth of technology-based and technology-supported businesses. Kenya, Tanzania, Uganda and Rwanda all have national broadband strategies and all five East African countries have made large-scale state-funded infrastructure investments.





IN TANDEM, ACROSS THE CAPITAL CITIES OF EAST AFRICA – AND INCREASINGLY IN OTHER MAJOR TOWNS – TECHNOLOGY COMMUNITIES OR HUBS HAVE SPRUNG UP.

The role of these hubs is to foster a culture of collaboration by creating permanent co-working spaces that act as a magnet to draw technology talent and technology investors. Over time most of these hubs have metamorphosed into or incorporated a business incubator function with programs that support startups in the ideation and pilot-testing phases of growth. The hubs have integrated training and research into their models, ranging from formal training on specific technical skills to community events with expert speakers from different domains. An example of this is Nairobi's iHub, started in 2010, with a 2016 membership of 15,000. Since 2010, 152 startups have been launched from the iHub community, primarily through connections sparked in the space. Similar technology hubs and incubators exist in other major East African cities, all at different stages of growth, with commonalities around community spaces, collaboration and spurring tech startups. Examples include Hive Colab and The Hub in Kampala, Uganda; kLab and The Office in Kigali, Rwanda; Kinu and DTBI in Dar es Salaam, Tanzania; Swahili Box in Mombasa, Kenya; and the Impact Hub that launched in Bujumbura, Burundi in 2015.

UNIFORMLY, ACTORS IN THE HEALTH SECTOR IDENTIFY TECHNOLOGY INNOVATION AND THE INCREASING PENETRATION OF MOBILE PHONES AS A TREND THAT WILL INFLUENCE EAST AFRICA'S HEALTH SECTOR.

Consider the following three innovations that have shaped the region's reputation: a) the meteoric rise of mobile money; b) the real time digital mapping app, Ushahidi, which uses crowd-sourced information; and 3) the development of multiple, vibrant tech communities. Alongside this bubbling innovation energy, East African governments have invested significantly in broadband internet infrastructure since 2009. These investments help lower costs and increase access to fast, reliable internet connectivity to spur growth of technology-based and technology-supported businesses. Kenya, Tanzania, Uganda and Rwanda all have national broadband strategies and all five East African countries have made large-scale state-funded infrastructure investments.

MEDICAL DEVICE AND LIFE SCIENCE INNOVATION INCORPORATING TECHNOLOGY IS IN EARLY STAGES OF GROWTH IN EAST AFRICA WITH INNOVATORS FROM OTHER REGIONS INTERESTED IN ENTERING THE MARKET.

Our research identified a recent growth in support organizations eager to specifically invest in health technology startups focused on the emerging areas of hardware innovation and life sciences. Gearbox is Kenya's first "maker space" that aims to support collaborative design and rapid prototyping of technology-based hardware innovations. Gearbox collaborates with iHub and the University of Nairobi's fabrication lab (FabLab) to identify innovators interested in hardware and technology. Their team prototyped low-cost medical devices (examination lamps, suction pumps) being piloted at Kenya's largest referral hospital. Villgro Kenya has identified life sciences innovation as a gap in the marketplace and launched an incubator focused on this area. In parallel, a number of innovators from other markets, notably India, who have successfully established low-cost medical device companies, are considering expanding into East Africa.

EXCITING TECHNOLOGY TRENDS ARE EVOLVING ACROSS EAST AFRICA THAT COULD POTENTIALLY AFFECT THE HEALTH SECTOR.

Macro-trends in the ICT field are interfacing with the health sector in other parts of the world and could potentially affect East Africa's health sector. Some of these trends include low-cost diagnostic devices, wearable technologies, telemedicine and widespread adoption of Electronic Medical Record systems (EMRs). Changes in technology that support innovation in these areas include: increasing penetration of smartphones that have capability to be monitoring devices as well as home health applications; the rollout of 4G mobile networks across East Africa that offer high-speed mobile data; faster internet through broadband connections; and reductions in the cost of hardware components.



THE HEALTH SECTOR IN EAST AFRICA COULD POTENTIALLY BENEFIT FROM DIGITAL INNOVATION IN A SIMILAR WAY TO THE FINANCIAL SERVICES, AGRICULTURE AND RENEWABLE ENERGY SECTORS.

Technology actors see the potential in the growth of the digital health market in East Africa. Currently, technology talent in the region often views the health sector as complex, with a longer break-even time compared to other sectors. Health professionals in the region rarely venture into health technology businesses and, as a result, there are few intermediaries between the two sectors. The SEAD Health Hackathon, described below, offers one example of how to spark translation between these two worlds.

SEAD HEALTH HACKATHON

Noting the lack of strong connections between the health and IT sectors in East Africa led the SEAD East Africa team to conceptualize and host Kenya's first Health Hackathon in September 2015. The Hackathon was designed to provide a space for collaborative creative problem-solving around critical needs in the healthcare sector. The end-goal of the event was to facilitate connections between health innovators and the technology community in East Africa so that both groups could understand better the market opportunity in the healthcare technology space.

The two-day event brought together health innovators, technology experts, clinicians and designers to prototype and problem-solve on new ways that technology can be used to deliver higher quality, cost effective healthcare. Using the multi-disciplinary approach developed by the Hacking Medicine team at the Massachusetts Institute of Technology, the SEAD team adapted the model to suit the context in Nairobi, where the Health Hackathon was hosted.

Each team had at least one health professional, one entrepreneur and a technology practitioner. The teams developed innovative technology-based solutions in three thematic tracks:

- 1) managing non-communicable diseases;**
- 2) increasing access to healthcare; and**
- 3) improving quality of maternal and child healthcare.**

Various corporate and institutional partnerships were essential to the success of the event. These partnerships provided resources for prize money, expert mentors, marketing/outreach support and co-hosting opportunities both for the Hackathon and pre-Hackathon events. The SEAD Health Hackathon corporate sponsors were BD, Merck Group, Amsterdam Health and Technology Institute, and Philips. The Hackathon institutional partners included the Strathmore Business School, iHub and @iLab Africa.

KEY HIGHLIGHTS OF THE HEALTH HACKATHON INCLUDE:

- » **280 applicants from across East Africa**
- » **Twenty teams formed by 102 participants, competitively selected**
- » **Private sector interest through corporate sponsorship of prizes and expert mentors**
- » **Pre-Hackathon event hosted at iHub highlighted challenge areas to the broader technology community**
- » **Three thematic tracks focused on existing and emergent health sector challenges**
- » **Four winning ideas earned post-Hackathon support**

A key insight drawn from this event included the need to connect other innovation clusters in the ecosystem to the health entrepreneurship ecosystem to tap into new market growth areas. Following the SEAD Health Hackathon, there has been a rise in interest in the digital health space with a focus on early-stage startups and the launch of at least three new digital health incubation programs underway or planned for 2016. This creates the necessary connection points and pipeline development required to grow organizations ready for the scaling support provided through SEAD, the Innovations in Healthcare network, and other accelerators.

TECHNOLOGY HUBS AND TECH INFLUENCERS NOTED THE DISPROPORTIONATELY LOW NUMBER OF HEALTH SECTOR-FOCUSED TECHNOLOGY STARTUPS.

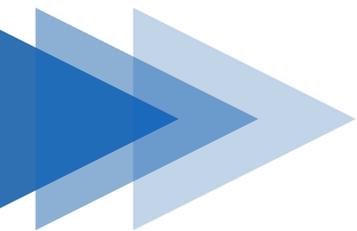
Despite the multiple potential interface points between health and technology, our stakeholder research found that there are a very small number of health-focused technology startups. Generally, coders in the ecosystem see health as a line of business, mostly limited to niche health products. However, some health innovators have been founded from regional hubs. One example is Toto Health, founded from Kenya's iHub with support from Microsoft's mLab.

Toto Health has developed a platform that uses SMS and voice technology to provide targeted information on danger signs and developmental milestones related to pregnancy and early childhood. access.mobile in Uganda is based out of the Hive Colab and has leveraged this ecosystem as it enhanced its patient engagement platform. One common characteristic of the startups within tech hubs is the focus on digital health. This focus may be influenced by the available talent in the hubs that attract software developers, the focus of funders attracted to the hubs and the examples of successful companies launched from these spaces.

F INCREASING KNOWLEDGE-SHARING

Sharing what market intelligence and assumptions inform the design of healthcare innovations, how companies have tested these healthcare innovations, and what they found to work and not work can prevent duplication, funnel resources to the right innovations, and accelerate growth of the best ideas.

EAST AFRICA'S LEADING UNIVERSITIES AND RESEARCH CENTERS HAVE A STRONG TRADITION OF PUBLIC HEALTH AND HEALTH SYSTEMS RESEARCH.



This research focus may be shaped by the context and challenges faced by countries in the region such as maternal and child mortality, HIV/AIDS and the rise in NCDs. Health has also been primarily taught in medical schools and only recently have cross-disciplinary approaches such as Health Systems Management become integrated. Few researchers are available to delve into areas such as health innovation. Similarly, while there are a rising number of social enterprises in the region, there are few notable partnerships between such enterprises and regional universities or research institutions.

HIGHER EDUCATION INSTITUTIONS ACROSS THE REGION HAVE LIMITED COURSE OFFERINGS ON ENTREPRENEURSHIP.

While business courses have long been offered at East African universities, the reorganization and rebranding of these courses into business schools only happened in the past decade. Business schools offer the strategic lens and may have faculty who are experts in thematic areas such as entrepreneurship. Consequently, there is an increasing appetite among universities in the region to offer entrepreneurship courses. Some 23% of Kenyan universities and university colleges offer specific degrees with entrepreneurship content while less than 7% of Tanzania's higher education institutions offer entrepreneurship courses at undergraduate or graduate level.

UNIVERSITIES ARE BEGINNING TO ESTABLISH INNOVATION AND ENTREPRENEURSHIP CENTERS IN COLLABORATION WITH CORPORATE PARTNERS.

Examples of these include Chandaria Business Innovation and Incubation Center at Kenyatta University, funded by Chandaria Industries, and the University of Dar es Salaam Entrepreneurship Centre (UDEC) in Tanzania, partnering with various corporations.

COMMERCIAL ENTITIES ARE ESTABLISHING RESEARCH CENTERS IN THE REGION WITH SOME RELATIONSHIPS/ LINKAGES WITH LOCAL UNIVERSITIES.

Examples include IBM-Research Africa, housed at Catholic University in Nairobi, and Philips Research Africa that collaborates with various universities in the region through innovation challenges.

THERE ARE LIMITED CASE STUDIES ON INNOVATORS OR SOCIAL ENTERPRISES IN THE REGION THAT HAVE BEEN WRITTEN BY EAST AFRICAN UNIVERSITIES.

This is despite an increase in the number of entrepreneurship centers at various universities across the region. Certainly, the possibilities for building more innovator research and case study development is a teaching and learning area for growth. The spotlight below offers one example of a university partnership.

SPOTLIGHT: Strathmore University and Duke University Partnership

The Strathmore Business School at Strathmore University in Kenya has partnered with the Social Entrepreneurship Accelerator at Duke University to develop case studies on healthcare innovations that will provide insight for students as well as for major funders and other organizations that work with healthcare innovators. A group of faculty, graduate students, and staff from both universities formed a Case Study Working Group, which is collaboratively researching and writing in-depth case studies on healthcare financing in East Africa. The case studies will be used as teaching tools by faculty at both universities.

VIII. Summary and Implications of the Findings

Healthcare innovators face many critical external and internal challenges to growth and scale. This analysis revealed a number of issues, prospects and ecosystem-building partnership possibilities that can help shape the future potential of innovations to make quality healthcare more accessible and affordable.

THE RESEARCH CAN INFORM AND GUIDE ECOSYSTEM STAKEHOLDERS AND OFFERS A NUMBER OF IMPLICATIONS:

» **The East African region is a high potential healthcare innovation market with numerous growth opportunities.**

The ecosystem research identifies specific areas where crowding in of additional innovations and new business models would result in value creation and capture. These existing market opportunities reflect regional macro-trends and specific country contexts while also mapping to the overall changing healthcare consumer landscape in the region.

» **Understanding market context is key to unlocking the value that exists in the East African healthcare market.**

Characterizing types of innovations and identifying innovation pathways yields an understanding of market context. Coupled with a nuanced view of country trends, this understanding benefits innovators, funders and others seeking to support innovation growth in East Africa's healthcare market.

» **Closer collaboration among actors and institutions in East Africa's healthcare innovation ecosystem gain from collectively focusing on better alignment of resources and increased connection points.**

As the healthcare innovation ecosystem continues to mature, closer collaboration is needed in order to support more innovations implemented and taken to scale. Such a collective focus will allow increased efficiency in resource allocation to help health systems in the region meet the ever-evolving needs of consumers. Areas of collaboration include financing, partnership, and building a robust evidence base.

» **Innovation requires innovative funding.**

This report and other publications demonstrate the limited growth capital available to support innovative growth-stage ventures. There is often a mismatch between the needs of ventures and the expectations of funders/investors. To reduce this mismatch requires the deployment of early- and mid-stage growth capital in ways that allow ventures to learn, iterate, and scale successfully. This will in turn result in more sustainable enterprises able to show impact.

» **High-value partnerships with the public sector are an important pathway to scaling healthcare innovation in East Africa.**

Across the region, the public sector plays multiple roles in the health system through regulation, financing and provision of care. Partnership with the public sector remains a viable pathway for healthcare innovations to achieve scale. Structuring high-value public-private partnerships requires learning from both sides, the patience to build trust while investing in structures and processes to administer the collaboration. A key shift in mindset that is required is the realization that successful public private partnerships are about more than money. Knowledge transfer, capacity building and sharing can be equally as valuable on the path to scale.

» **There is a need to design new engagement models for private-private partnerships that mutually benefit growth-stage enterprises and corporations.**

Relatively few ventures are successful in building partnerships with multinationals despite the untapped potential in this area. Some issues that need to be solved include mapping viable market and partnership opportunities to match the commercial interests of corporations. Aligning mutual interests and incentives while considering the realities faced by healthcare innovators in the region may improve the success and potential of private-private partnerships.



» **The digital health space in East Africa has numerous niche opportunities that require connecting the dots between health and technology innovation clusters.**

While the health sector recognizes the leapfrogging opportunity technology provides in light of global technology trends, there are relatively few health technology startups coming out of technology hubs and innovation communities in the region. As the SEAD Health Hackathon demonstrated, making the case for unexploited market opportunities in digital health is timely. Broadly, health and technology ventures are translating their initial entries to market entry experiments and collaborations. One way of growing the healthcare innovation market within East Africa is by connecting the adjacent technology innovation clusters to the healthcare innovation ecosystem. This will help innovators to build health technology products that meet the healthcare needs of the region.

» **With the healthcare innovation ecosystem set to grow, there is a need for investment in research and knowledge creation through academic and commercial research centers East Africa has significant, long-term experience in traditional research areas, such as public health and epidemiology.**

Innovation and entrepreneurship are new concepts being introduced in institutions of higher learning. To spur growth of innovation in the region, universities and research centers need to build a local evidence-base on healthcare innovation successes and failures. This research will provide both a conceptual foundation for new innovation while allowing documentation of what works in the East African context. Leveraging the investment by commercial entities in research centers within local universities will provide the opportunity to develop and broaden the capacity of local institutions to support the East African healthcare innovation ecosystem.

IX. Conclusion

Positioning to interact with and help shape the ever-changing healthcare innovation ecosystem requires understanding trends and contexts in multiple markets and countries. Innovators operate across many aspects of healthcare delivery, such as creating patient and provider networks, improving provider training, and creating technologies to improve efficiency and financial sustainability. To support healthcare innovators, it is necessary to align resource inputs with the growth-stage of innovators, making growth capital more innovator-friendly. While partnerships with multinational corporations have achieved some success, there is need for innovators to understand better the structure and decision-making mechanisms within multinational corporations. Beyond strengthening partnerships within the private sector, going to scale often needs involvement of the public sector.

Synonymous with a culture of technology innovation, stakeholders in the health sector identify the increasing penetration of mobile phones as a trend influencing East Africa's health sector. Medical device and life science innovation incorporating technology is in the early stages of growth in East Africa, and is encouraging to innovators from other regions interested in market expansion. Innovators need access to resources and increased connection points with funders, so that innovation-savvy funders meet the risk challenges of matching funding to innovators' growth stage. Health and technology clusters can join together to create leapfrogging opportunities, using proven innovation from other sectors. There is need for more investment in research and knowledge creation to spur replication and adaptation of models to expand healthcare access for all.

Duke SOCIAL
ENTREPRENEURSHIP
ACCELERATOR AT DUKE