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Less innovation, more scale

Realising the promise of health technology in Africa

The proliferation of information and telecommunication is a potential game-changer in the delivery of healthcare in East Africa. Understanding what models work and growing them to scale will be key to radically improving health outcomes for all Africans.

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Feb 2014 White Paper

About this white paper

This paper examines the explosive growth in technology innovation in healthcare that is taking place in East Africa.

The contents of this paper will be of interest to all stakeholders interested in advancing access to quality of care in resource constrained environments.

It is based on the aggregation of data from Exelsior's own work as well as research from other sources the Centre for Health Market Innovations; The World Health Organisations' Compendium of New and Emerging Health Technologies; World Bank and IFC, and interviews with a series of experts from the private sector: donors, industry, academia, government.

We thank the interviewees for their time and insight.

Expert insight panel

- Anurag Mairal, Ph.D. MBA. Program Leader for technology solutions, PATH.
- Dr. Ayub Manya, e-health, Kenyan Ministry of Health.
- Dr. Jay H Sanders, M.D. Former CEO of the Global Telemedicine Group.
- Judy Njogu, Product Manager for Social Innovation, Safaricom.
- Prof. Stephen Sammut, Senior Fellow, Health Care Management, Wharton School, University of Pennsylvania.

At a glance

- Rapid growth of information and communications technology in East Africa is spurring increased interest with several new applications aiming to improve healthcare delivery.
- After years of unmet potential, e-health appears to be maturing, and today may be on the cusp of transforming the accessibility, quality, and affordability of healthcare.
- East Africa is a key contributor to the global upward trend or innovations aimed at unlocking the potential of e-health technologies; at least 115 programs are currently in progress.
- Hampered by systemic constraints, several of these programs are speculative pilots, making it difficult to scale them up into sustainable enterprises.
- Seven simple steps can catalyze growth of e-health technology and transform healthcare.

Introduction

"It's almost as if I have a doctor on my phone, helping me every step of the way," says Halima, a first time expectant mother in rural Tanzania. Her mobile phone could be a lifeline in Tanzania where women still face an unacceptably high risk of preventable morbidity and mortality during their reproductive years.

Halima is one of 125,000 pregnant mothers in Tanzania that have received sms text alerts under the *'Wazazi Nipendeni'* system, which provides information on pre- and post-natal care for prospective parents. More than 5 million messages have been sent under the initiative, which began operation in 2012. In Tanzania, the *'Wazazi Nipendeni'* system is only one segment of a well-designed and integrated e-health system.

Over the past few years, the government and its partners, such as the US Government's Centers for Disease Control and Prevention (CDC), have put in place an integrated e-health system with four forms of services: e-care, e-surveillance, e-learning and e-administration. The country has also launched a new strategic plan in 2013 to guide the implementation of e-health programs in the next five years. This e-health strategy has been rolled out against a backdrop of a 77% increase in public health spending from 2000 to 2010.

A core part of the strategy is the District Health Management Information System (DMIS). This program has streamlined the management of regional health centers with good results: patient wait times have decreased from more than a full day down to 30 minutes in some facilities; patient files are now transferred more securely with less than 1 percent of files missing, down from 30 percent. Moreover, robust measures have been put in place to monitor the positive impact on health outcomes.

This example from Tanzania demonstrates that well designed and coordinated efforts can successfully scale up e-health technology. Technology in turn can improve data management, health-worker training and ultimately, healthcare access and delivery. If models like the one in Tanzania could be replicated, e-health could well be poised to transform East African health systems.

A health crisis on the Continent

Despite recent improvements, the health of the vast majority of Africans remains at risk. Sub-Saharan Africa has 11 per cent of the global population, but carries 24 per cent of the world's disease burden. On the basic indicators of health, the Continent compares poorly, even with other developing regions: One in six children born in the region today will die before age five; African women face more than 100 times the risk of maternal mortality than do women in the developed world; the average life expectancy in Sub-Saharan Africa is a mere 52 years; and sadly, most countries will not meet the United Nations' Millennium Development Goals for health by 2015, let alone address significant non-communicable diseases now on the horizon.

To further exacerbate the issue, Africa only has 2 physicians per thousand people, compared to 14 globally. Furthermore, many governments have limited capacity and resources to spend, meaning that per capita expenditure on health on the Continent is below the global average, and in some countries below the minimum level of US$34 that the World Health Organization considers sufficient to deliver basic healthcare. In total, Sub-Saharan Africa accounts for just 1 per cent of the world's total expenditure on health. Much of the burden on spending falls on private individuals, with the majority of spending occurring out-of-pocket.

The hurdles appear insurmountable.

An emerging middle class demanding better health services

At the same time, the African Continent has undergone an economic renaissance in the past decade, with unprecedented levels of sustained GDP growth. As income levels rise, a new middle class is demanding better services for their money, creating new markets for healthcare providers.

This rising middle class already has a high level of technical literacy, and has habitually adopted new technologies for communication. Mobile phone penetration on the African Continent has surpassed 75 per cent, and mobile phones have already transformed other sectors with well-known success stories in finance and banking.

In this context, it is easy to understand why policy-makers, governments, development partners, and even private investors are placing so much hope in the potential for e-health technologies.

The potential of e-health technology

E-health technologies hold the promise for Africa to surmount its healthcare challenges and meet the demands of its people. Dr. Jay Sanders, the former Chairman of the Global Telemedicine Group, has been studying and advocating for wider use of e-health for more than four decades. In that time he has seen a multitude of false starts for this budding sector. Dr. Sanders now says that mobile technology has become so advanced and ubiquitous that medical diagnostic tools are in the hands -- and pockets -- of millions of people around the world. E-health and telemedicine are on the cusp of becoming an everyday reality.

"The massive spread of smartphones and health-related applications has accelerated the development of e-health," Sanders says: "With all of the health apps now available, we live in an age where one can literally carry their healthcare delivery system in their pocket."

Sanders is enthusiastic about how such technologies can revolutionize medicine in Africa.

"Around the world, there are now apps for the smartphone that convert it into a microscope," he says. "There is an app that is an otoscope, so you can look into a child's ears. There is an app now that connects to the microphone and converts the phone into a stethoscope. There is an app that is an EKG for monitoring heartbeats. There is an ultrasound app that allows you, via a smartphone, to perform an ultrasound of someone's heart, or that allows a mother to perform an ultrasound of her abdomen. If I was a radiologist half way around the world, modern teleradiology allows me to read an MRI or CT scan and also consult with the health worker on the ground.

With such potential, the mobile phone can become the electronic black bag for the health worker, and the examination room for the patient."

A proliferation of e-health solutions seeking real world problems

The streamlined data collection that comes with many e-health systems allows for several health indicators to be measured. Of the 357 innovative healthcare service delivery models in East Africa monitored by the Washington-based Center for Health Market Innovations (CHMI), over 30% (115) report using information technology as a core part of their approach. In addition to CHMI's dataset, countless other private sector developers have mobile health applications, though an accurate accounting of these businesses does not exist. CHMI encourages its programs to report regularly on how they are working to improve care along 10 dimensions -- from affordability to efficiency, user satisfaction, and health outcomes. Of the East African programs using e-health, about 20% (27) have reported impact in at least one category, predominantly in health outputs and affordability

While the use of technology is rampant, the programs are not yet at scale.

Anurag Mairal, the Program Leader for technology solutions at PATH, a global health innovator, takes note of the scalability issue. He says, "The e-health sector been prone to "pilot-itis. We have many interesting projects that have been taken to the field, but most are neither sustainable nor scalable. A lot of solutions have come from technologists and engineers who are excited by the innovation. Often, however, they do not start with an analysis of the true unmet need. If one were to start with the unmet need, then consider the appropriate technologies; and follow that with a complete business model in a sustainable value chain, then the solution one ends up with could be very different. Moreover, end users must be central to the design. Innovation has to happen in the crucible of real world demand, and has to be inspired by the real day-to-day scenarios faced by healthcare professionals or policymakers. If it doesn't make lives easier, or reduce costs, the product will not be adopted," Mairal says.

Exhibit 1: Scalability of e-health program

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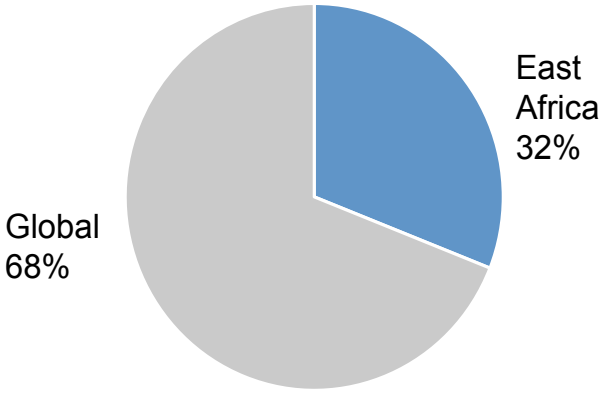
While East Africa is a hive of e-health innovation, most programs are donor funded

CHMI innovative healthcare programs using technology

Total = 1219



- East Africa is a hub of e-health activity
- After India, Kenya has the second highest number of programs globally

Most programs are donor funded non-profits
Kenya example

Total = 183

Donor funded	= 80%
Non-profit	= 70%
Technology based	= 61%

(Phone, Computer, Tablet, Remote diagnostic tool, Unique ID)

Source: Center for Health Market Innovations, 2014; assumes overall metrics for Kenya translate across all programs including e-health

Private investment held back by lagging regulatory policies

Current estimates by GSMA, the mobile telecommunications consortium, forecast the mobile health market in Africa at US$1.2 billion by 2017. This figure does not include other investment areas for e-health such as health management information systems. Such an amount, represents a significant opportunity for private investors; however several factors hamper the private sectors full engagement.

While design elements are part of the problem, the private sector's ability to develop and roll-out e-health services has been constrained by the policy environment and the speculative nature of investing in these technologies. Often the pace of technology moves far faster than the ability of governments to keep up.

As Dr. Ayub Manya, former head of the e-health program at Kenya's Ministry of Health, says that, government regulators need to be educated about new technology, so that they can make informed decisions. This has a great impact on not only regulatory policy, but also on government procurement decisions.

With the liberalization of African economies, several opportunities are opening up for businesses to actively participate in public sector projects, and directly invest in the creation of health services at the point of need. Healthcare technology investments can generate both commercial and social returns. In order to achieve this, stakeholders need to develop a common agenda, share measurement systems, mutually reinforce activities and continuously communicate.

Dr. Manya believes that a three-way bargain could ultimately lead to the successful growth of e-health projects: governments sets the rules and create stable policy environments; donors help to de-risk the development process; and the private sector supplies the capital and expertise to drive projects to scale.

Some players are getting it right

Even with the current challenges, the e-health landscape in East Africa offers up some success stories, suggesting that we could well be at a tipping point: One that could portend the coming of scalable e-health solutions to address the Continent's health concerns.

In Kenya, the mobile operator Safaricom recently launched a medical insurance product partnering with two insurance companies - Britam, a large African insurance company, and Changamka, a local micro-insurance social enterprise. Called Linda Jamii (Kiswahili for "Protect the Family,) the product costs less than US$150 per year and uses mobile phone-based micro-payments for

subscriptions. Judy Njogu, product manager for social innovation at Safaricom, explains that while the company has a strong social mission, it also ensures that the projects it undertakes are commercially viable. The beauty of Linda Jamii is that it takes advantage of Safaricom's 17 million subscription base of Kenyans already using M-PESA, the mobile money platform. Britam's underwriting capabilities, ensures the viability of the insurance product while Changamka brings a large social enterprise network. The program is expected to sign up over 1 million families within one year (an estimated 5 million people) and has the opportunity to reverse the impact of catastrophic medical costs afflicting low and middle income Kenyans.

In Tanzania, the KCNU Health Plan, a partnership between the Kilimanjaro Native Cooperative Union and the Mission for Essential Medical Supplies serves more than 7,000 people with affordable primary healthcare. Through its collaboration with a mobile-based distribution system, Microensure, the program has been able to improve penetration rates of medical supplies to between 35 per cent and 55 per cent in local communities. Medical teams use mobile handsets to register members, automatically uploading data to a central system. Payment is collected using mobile money, again making good use of partnerships and available distribution platforms.

Another example can be found in AMREF's e-learning program. Beginning in 2005, the program was designed to use technology to solve the chronic shortage of skilled nurses in several African countries. AMREF's program both improves the skills and increases the numbers of health workers in community and facility based cadres. Today the program can be found in at least 8 countries – Ethiopia, Kenya, Malawi, Senegal, Tanzania, Uganda, Senegal, Lesotho, and Zambia. A core part of the well-funded program is to work in partnership with other stakeholders including health worker associations within each country. In just a few years, the program is already passed the halfway point of a stated goal of training 22,000 health workers. The potential for such a program to increase access to healthcare across Africa is enormous.

Expert insight: Bringing down the barriers to scale for e-health entrepreneurs

Telemedicine and e- health business models are designed to employ telecommunication to deliver expertise in places where it cannot physically be found. Other models deployed include re-engineering the design of devices in such a way that they can be used in low resourced, decentralized settings. The models have proven difficult to scale up, but these issues can systematically be overcome.

In India, companies such as General Electric have an entire research group dedicated to telemedicine, modifying EKG machines, for example, so that they can be used in the field with batteries, and a telemetry link back to a clinician in a central location. Other groups are developing a myriad of successful mobile based platforms that tackle everything from patient care algorithms to collection of primary care data to innovations in medical insurance schemes.

All of these groups have a common set of problems that hamper scalability. The first problem is lack of a regulatory framework to efficiently approve these technologies, meaning that the companies are in the dark as to whether they can legitimately use the products. This is the case, even though the products themselves are completely safe and effective. The second problem involves how to scale up manufacturing and distribute what are essentially prototypes, in an environment that sometimes lacks the necessary infrastructure. A third challenge is the training of workers on the use of the new technologies. Despite the growing simplicity of the technologies, these products and processes often exceed the capabilities of local health workers. Fourth is the determination in a given setting of who the end user will be, and what market dynamics will be involved in order to plan for commercial viability. Finally, and most importantly, is the continuous monitoring over time in order to improve the effectiveness of the product. This ensures that the product and its business model is to real life situations, rather than a closely monitored pilot.

While these are the e-health scalability issues encountered in India, they are likely true of other resource constrained environments.

Prof. Stephen Sammut, Senior Fellow, Health Care Management, Wharton School, University of Pennsylvania.

Towards a promising future

So what is the solution to scaling up e-health in Africa? The future seems bright. While there is no "silver bullet", our review of successful models suggests that seven simple steps, taken in tandem, could lead to a dramatic growth in e-health programs.

First, policy makers should create a strategic framework to support and build an e-health ecosystem. This framework should outline rules and regulations across the public and private sectors, and create an enabling environment for a coordinated approach to investment.

Second, entrepreneurs and project managers, must focus on building products that fit within an entire business model. Projects must consider the end users and the entire value chain, so that projects are economically viable and socially sustainable at the onset.

Third, e-health projects often depend on changes in human behavior. In designing projects, one must take into account the behavioral and social economics that would impede scalability. Consider the attitudes, behaviors and mindsets of end-users and other stakeholders in the value chain.

Fourth, use the existing technology platforms that are already in place, and at scale. Mobile technology is an excellent model to build from. However, e-health programs should consider interoperability with other relevant systems (such as payor systems) and involve all other stakeholders as part of the planning. Another example of existing platforms is the large infrastructure and patient base that exists in the public sector. A well designed e-health program for Africa cannot ignore the public health sector.

Fifth, ensure that projects are adequately financed beyond the initial stages. While most of the current e-health initiatives are donor funded, the private sector should be encouraged to play a larger role. Donor or government incentives could be key in de-risking projects, and attracting larger private sector investments.

Sixth, continuously measure progress and iterate on the operational plan. In Africa, it can take a while to get things right. Often times, a project may need to be disaggregated into smaller elements so that more successful ones have a chance to succeed.

Finally, invest in building human capital. No program is scalable without a training program. Successful programs not only train their own workers, but also design training programs for potential partners.

Completed together, we believe that these steps could revolutionize healthcare in Africa; a pre-requisite in ensuring that Africa's recent economic gains are protected and sustained.

About the authors

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