Erik Hersman

Mobilizing Tech Entrepreneurs in Africa

Innovations Case Narrative: iHub

Seth Kigen stepped onto the brightly lit stage in Nairobi, Kenya, for an event that was the culmination of the many weeks Seth and his partner had spent doing late-night coding, hardware hacking, and thinking through business strategies. Each year, entrepreneurs pitch their ideas on the Pivot East stage, the showcase for East Africa's best early-stage ideas for mobile apps and services. This year, over 200 applicants from Kenya, Uganda, Tanzania, and Rwanda were battling to see who would walk away with the $10,000 prizes given out in each of the five categories. Seth was just one of 25 people chosen to tell about their ideas and try to convince a panel of judges, in addition to potential investors, media representatives, and investors, that their team was worth betting on.

Seth intended to win the $10,000 prize for his mPoultry system, which helped farmers monitor their chicken brooders with a device comprising a microcontroller and three sensors for gauging temperature, light, and humidity. The first-generation prototype plugged directly into the IDEOS—at approximately $80 the world's cheapest Android phone, often referred to in Kenya as the IDIOT phone.

Seth built mPoultry around the simple problem East African farmers had of losing up to 80 percent of their poultry stock as a result of unmonitored brooders. The mPoultry device sends text messages to a farmer when his brooders' environment becomes abnormal, which allows him to adjust quickly to issues that otherwise might not be caught for hours. A device like this could cut the time a farmer spends monitoring his brooders by 50 percent, while also helping him raise healthier hens and cut losses by up to 90 percent.

But mPoultry did not win the competition. This year the overall winner came from the entertainment category, where Ma3Racer took the prize with a Matatu racing game that has been downloaded 150,000 times in over 200 countries. Last year's overall winner was MedAfrica, an app that enables patients and doctors to communicate through mobile phones.

What happened in East Africa to get all these startups on stage? The tech scene in Kenya (and in Africa more generally) has grown significantly and uniquely, to

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some extent because of the distinctive East African environment. My colleagues and I, all of whom are committed to fostering a bigger and more enabling tech environment in Nairobi and throughout the region, have built institutions that leverage the strengths of our corner of Africa and seek to address the weaknesses. Here I tell the story of some of those projects—the iHub, the m:lab, and Pivot East—and describe Africa's tech environment, including the success stories that have already or soon will come out of the region.

EAST AFRICA'S TECH ENVIRONMENT

There are only five or six cities in Africa that have the right make-up to be a technology hub. It takes a combination of location, talent, policies, entrepreneurial culture, infrastructure, and money. For my two cents, I'll give you Nairobi, Lagos, Accra, Cape Town, Cairo, and possibly Dakar. However, in any region there can be only one city with the critical mass to be number one. In East Africa, Nairobi has the advantage of location, climate, and a history of being relatively stable. The city also has a lot of available capital, although most of it still goes into sure money-makers, like land and buildings. Nevertheless, Nairobi has become a major hub for mobile phone application innovation in Africa, providing a regional center with a critical mass of quality programmers, universities, technology corporations, and a

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government focused on information and communications technology (ICT) growth, all of which are necessary for tech entrepreneurs to grow and flourish.

These factors have helped make Nairobi the first choice of many international NGOs, including the United Nations Environmental Program, the only major UN program headquartered outside the U.S. or Europe. This, of course, makes it attractive to a lot of smaller NGOs that operate in Kenya and in more troubled zones, such as Sudan, Somalia, and the Democratic Republic of the Congo. The city has a steady stream of white SUVs that carry around the expats, who spend money and provide white-collar jobs for local professionals. Nairobi is also an attractive location for global tech companies, including Google, Nokia, Airtel, Inmobi, Intel, Microsoft, and more. Hungry for tech talent, these businesses provide great value by training the next generation of business people and engineers.

It isn't easy to create or duplicate the right growth environment for tech, as it is nuanced, organic, and grows over time through the aggregated acts of individuals. Much of what makes the Nairobi tech scene a success comes from its spirit of *harambee*—a cultural dichotomy of competitive entrepreneurialism joined with a community that works together—that is so much a part of Kenyan life. While Kenyans enjoy healthy competition, they would rather work together and celebrate each others' successes, as they know that if they help each other along, more will succeed and all will benefit. The grassroots entrepreneurs who engage in this process are the people who feed the future. The young university graduates and entrepreneurs crazy enough to reject a corporate job to try their hand at building their own empire are the ones who need to be nurtured in ever greater numbers in order to create to a foundation Kenyans can build on.

Even with all its advantages and entrepreneurial spirit, Kenya wouldn't be where it is today without certain government policies and regulations. The country relies on its government leaders who are willing to make hard choices for the future of the country, not for themselves or their cronies. Innovation often seems almost inversely proportional to the amount of regulation in many countries. For example, why does Nigeria lag in technology innovation despite its huge population, or South Africa, which has the most capital? The answer is that the regulatory climates for banking and telecommunications in these countries have hamstrung their futures. Meanwhile, Kenya walks a fine line, with regulation loose enough for new ideas to be tested and parameters that can be adjusted as emerging markets and business models reveal their strengths and weaknesses. The M-PESA story, discussed below, was made possible by regulators, including farsighted individuals like Dr. Bitange Ndemo, the country's permanent secretary for information and communications, and the leaders of the Communications Commission of Kenya, who were willing to see beyond the status quo enjoyed by the banks and let another model be tested.

THE IHUB AND ITS PROJECTS

When I look at the tech scene in Africa, I frequently ask myself which parts of the technology ecosystem we own and which we rely on others for. I also wonder about the core components that enable a country to own its technological future. Do we build our own software or do we import it? Can we prototype and build our own hardware, even if only on a small scale? Are we investing in our own startups, or is that being done by foreigners? Are we producing our own researchers, or do we turn to those from abroad to do that work for us? I do what I can here in Kenya to act on these questions and hope that the model can eventually be used elsewhere. The iHub, m:lab, and iHub Research are examples of my efforts that are focused on local software, startups, and funding.

The iHub

If you go to the top floor of a four-story glass building along Ngong Road, one of Nairobi's main arteries, you'll walk into the nerve center for all things tech in Kenya: the iHub. The iHub is Nairobi's innovation center, the place where the tech community, industry, academia, investors, and government can meet, share ideas, and collaborate. It looks much like any other office space in the world, with a little bit of Nairobian flair. More than 50 Kenyan programmers and designers are among the people one will meet during a day's visit to the iHub, along with others who are passing through—investors, people from the media, or traveling staff from Google, Nokia, Facebook, and Twitter—but the mix of people might be totally different on the next visit. In fact, there are over 8,000 iHub members, 250 of whom can use the space at any one time, and iHub hosts more than 100 events each year. Kenya's top technology leaders and thinkers speak to the members frequently, and visiting leaders from the tech world include Nokia CEO Stephen Elop and Google vice president Vint Cerf.

The existence of the iHub—not merely as a space but as a community commons that reflects a shared vision of the future—provides a foundation for Kenya's current vibrant technology environment, which was built on the foundation of those who have gone before. I, for example, am one of the founders of Ushahidi, an organization that was formed in the midst of the post-election violence in Kenya in 2008. Many of us put our time and effort into building and gathering information during that difficult time in our country's history, and we are part of the Kenyan tech community.

A discussion took place at Barcamp Nairobi 2008, a tech "un-conference" the community puts on each year, about how valuable it would be for Kenya's tech community to have a space of our own. The founders of Ushahidi decided that we liked the idea enough to fund it. It fit with our overall thoughts on being open, it would serve as Ushahidi's home in the region, and, most of all, we felt it would give us a base from which we could use our good fortune to find and help the next start-ups in Kenya. We needed a place that was flexible enough to be turned from a community commons into an event space. We wanted part of the space to house rentable desks, where members could incubate new ideas and work together on activities, and of course we included a coffee shop. Pete Owiti, one of Kenya's top baristas, opened Pete's Coffee, which we consider the core of the iHub culture and the place where people can sense the vibe of what happens here. Above all, the iHub needed to be a place Kenyan techies were proud of, a place that was uniquely ours that we could show off to our friends from abroad. It had to have the feel of being a high-tech community space one could find anywhere in the world, but with a Kenyan flavor. And it is.[1]

The m:lab

At about the time we started iHub, we also helped to create the m:lab, a mobile applications and services incubator serving the entire East Africa region. It

includes a testing lab, training room, boardroom, and offices used by the companies conceived in the space. The m:lab sits directly beneath the iHub, which provides m:lab with event space, as well as networking, administrative, and other services as needed. Opened in June 2011, the m:lab currently has partnerships with MIH Internet, Inmobi, Nokia, infoDev, and Samsung. The group behind the m:lab is led by the iHub and also includes the Web Foundation, the University of Nairobi, and eMobilis. The iHub and m:lab are environments where all corporate players have equal access to the market and entrepreneurs who use the space have access to capital and markets.

Other initiatives have emerged out of the iHub, including the iHub Research arm that was started last year. It came about for two reasons. First, not enough technology research was being done in Africa by African researchers, and we knew we could create a space for that purpose. Second, it gave us the excuse to gather and present much-needed market information for the greater tech community that would help them make better decisions for their organizations.

The iHub UX Lab and iHub Cluster

The newest additions, both of which came online in the summer of 2012, are the iHub UX Lab and the high-performance computer cluster, the iHub Cluster, which together fill a void not just in Kenya but on the African continent. In the software space, design is one of Africa's weakest points—not just web or mobile design but product design. The problem is rooted in the lack of understanding or desire to provide a better user experience. The secret to being able to provide better products is to do research on what users are looking for and how they are using technology in the first place. UX Lab thus will serve the entire region as a place where companies and startups can learn about the user experience as they are thinking about developing new products. This will take place through master-class skills training, partnering with the world's top UX experts, and providing the resources for this to happen.

At the end of 2011, I was approached by one of the iHub Green Members about building our own supercomputer. Outside of South Africa there is little to no capacity on the continent for cloud computing, and few of the programmers in our region have the skills necessary to work on and build this infrastructure. This means that we have a severely limited foundation on which to build future services in an increasingly cloud-based computing world. We envision a few cases where there will be a need for this:

• Research and training opportunities for super computer enthusiasts and university students
• Training people capable of being service reliability engineers
• Power-computing services for local content, such as video editing and production
• A host for parallel and resource-hungry applications, such as weather and drought prediction and real-time information dispatch

As with the UX Lab, the iHub Cluster provides a place where people can learn what goes on under the hood of high-performance computers by building one and learning how to use its power to solve big data problems. The iHub Cluster also will be made available to local animation and ad agencies for rendering services. We currently are looking at hardware and thinking about what it would look like to have our own hacker space and tech shop in a model suited to Kenya.

Like the m:lab, the UX Lab and iHub Cluster are located in the same building as the iHub, and both are being built with the greater Kenyan tech community in mind. Like all of the iHub initiatives, they only work when people from the community are a part of them.[2]

Other Initiatives Driven by iHub

The idea for Pivot East sprung from the m:lab. Early on we were trying to create a showcase for the mobile apps that were being built in the region and to make it the type of event that gave investors and media alike the excuse to travel to Nairobi. We agreed that, if it worked, all profits would go to making the m:lab sustainable.

The 25 Pivot East finalists are selected after a heavy elimination process, and once selected they go through a further battery of workshops and one-on-one meetings to fine-tune their business plans, presentation decks, and speaking skills. We've just finished year two, and next year's event likely will take place somewhere else, probably Uganda or Rwanda, as we aim to get more regional players involved.

The biggest gap in Africa's tech scene is finding angel investors and seed capital. This gap has three main causes: a "lower hanging fruit" in land and buildings for local investors, local investors who don't understand the software space, and international investors who don't understand the region. Nevertheless, if you look across the region you'll see a handful of great tech companies and organizations that have made it. They can be considered a success of innovation or of business, or both. Everyone wants to be at the tip of this, but most are far below, the guys who keep slugging away. They have some clients and revenue streams but they're not at the top—yet. That's what we deal with in places like the iHub and m:lab—the people at the bottom of the pyramid who are reaching for the top. They include the scrappy startups that are risky and probably don't yet have a solid business model, and only a few will graduate into the small and medium enterprise space above them. There is only one way to make the tip of the pyramid bigger and to have more success stories in the tech space: the base of the pyramid has to become broader.

Putting our money where our mouth is, in May 2012 we announced the Savannah Fund, a Silicon Valley-style accelerator model we are bringing to Africa and will tweak as needed to make it work for our region. It's a small fund, just $10,000, and most of the activity will consist of classes for five startups at a time that are being brought on board and invested in. Each will get $25,000 for 15 percent equity and have three to six months to prove themselves. Those that fail either

pivot or leave, and those that gain traction have a chance at follow-on funding. A portion of the fund will be invested at the $100-$200 thousand range, where we'll look at follow-on funding for the qualifying startups in our program and at other high-growth tech companies in the region. We'll be looking throughout the region for where to make these investments, from Rwanda and Tanzania to Uganda, South Sudan, and Kenya. We already have raised half of the fund, which allows us to start moving. The dealflow is growing and we've seen places like the iHub pop up in 15 other countries across the continent. There is MEST in Ghana, ccHub in Nigeria, Bongo Hive in Zambia, iLab Liberia, ICE Ethiopia, ActivSpaces Cameroon, and others, all of which are a part of the AfriLabs network. The next generation of Africa's tech entrepreneurs will come from these spaces.

REGIONAL OPPORTUNITIES AND CHALLENGES

I was recently asked, "How do you find innovators?" It's an odd question really, one that I hadn't thought about before, but one that is worth thinking through. One has to think about why innovations happen at all and what the power structures are that allow them to be identified as innovative. After all, innovation is just a new way of doing things that differs from what is currently the norm. There are status quo powers at play in any industry, society, or business, generally legacy structures that are set up for a time and place that needed that design. Consider how the broadcasting and print media have been disrupted by the Internet, mobile phones, and social media in the last 10 years. How about government? How about the humanitarian space? How about the energy industry? All of these were innovative when they came into their own, decades and even centuries ago, but they now represent the status quo in both infrastructure and design. By their nature, they fight to maintain the power structures that keep them in the position they hold, but their relevance in their current state is in question.

In East Africa alone, where Internet connections were extremely rare just 15 years ago, we now sit on four undersea cables that pipe in massive amounts of bandwidth. In 2002, Africa had just over 1 percent Internet penetration; it's now at 36 percent. Ten years ago, only the richest people had mobile phones, with less than 4 percent penetration in the market; today penetration is 67 percent. It goes on: 87 percent of Nokia phones that cost under $100 are sold in emerging markets; 34 percent of Africa's 313 million population is now considered middle class; Ghana has the fastest growing economy in the world; and five of the ten fastest growing economies are in African countries, including Liberia, Ethiopia, Angola, and Mozambique. Finally, across the continent, future average GDP growth is expected to exceed 5 percent.

Innovation starts along the edges, so it comes as no surprise that innovators also are found in the margins of society. They are the misfits among us, those who see and do things differently, who challenge the status quo and the power sources that prop it up. Think about what you're really asking for when you say you want innovation in your space, because what you're asking is for the outliers, the disrup-

tors, and the rebels to have their way. You're asking for a new way of thinking and doing. If you're in a position of power within an industry, you're likely going to be upset along the way.

The typical example here is mobile money. As technology journalist Farhad Manjoo has stated, "Nearly every startup working in payments is simply creating a new front end for your credit card." This is true if you live in the U.S. or Europe. It's also why M-PESA is so important, as it represents both a new form and a new source of mobile money. M-PESA is a peer-to-peer money transfer system that frees individuals from being tied to a bank. In fact, M-PESA destroys the paradigm for making payments as we know it. M-PESA is big now too—big enough to garner a lot of attention from the credit card companies and banks—with over 14 million users in Kenya, 9 million in Tanzania, and hundreds of thousands in Afghanistan and South Africa. It now processes more transactions in Kenya than Western Union does globally—somewhere in the range of 25 percent of Kenya's GDP is transacted on it. The banks have had a mixed response to this new technology, which has created the need to innovate beyond the status quo, and represents competition because the banks have to match MPESA's simple transaction costs. The credit card companies are watching closely too, and moving. MasterCard and Visa both are working on mobile offerings in an effort to create links with mobile operators in order to bypass a would-be competitor. It's a good thing M-PESA happened in Africa, as it offered a new way of thinking about money and payments without the legacy baggage of banks and regulations meant for another century.

Of course M-PESA isn't perfect. There is still the need for a payment system that works across mobile operators and can be synced easily with any bank, if needed; although some technologies achieve a semblance of this, there is a great deal more to be done. Generally speaking, mobile network operators were highly disruptive in the 1990s, but this has decreased steadily over the last decade.

Operators are no longer the offensive force of yesteryear; they're instead putting up barriers and defensive walls in an effort to hide and protect what they have. Disruption today comes instead from the open Web. Whenever operators attempt to block to what users want, usually with a high price or restricted access to their infrastructure, the Web finds a way to displace them. Examples abound—such as location-based services, text messaging, video, and photos. There's a reason operator revenue is shifting away from voice and SMS and moving toward data. The products that got the operators where they are today are receding in relative value. The user wants what's available on the open Web, and that's just not being provided by the operators.

THE STRENGTHS AND CHALLENGES OF AFRICA

While the world talks at great length about the shift of global power from the West (U.S./Europe) to the East (India/China), Africa is overlooked. That works in our favor—at least sometimes. Just a few of the ideas and products that have started in

Africa and been exported beyond the continent include M-PESA, Ushahidi, and Mxit. Africa's innovative ideas are based on local needs, many of them stemming from budgetary constraints, others from cultural idiosyncrasies. People from the West often can't imagine or create the solutions needed in emerging markets, as they don't have the context and do not understand the "mobile first" paradigm.

Throughout the world, the basic foundation of any technological success is identifying a problem or a need, and then solving it. That is what is being done in Africa. There are many different use cases and cultures, which means that there will be many solutions. Some will be valuable only to local populations and won't scale beyond a country or region, others will go global. Those that succeed in Africa will do so because they understand the nuanced life of Africans. Moreover, African innovators hold on to a technology longer, experiment with it, even abuse it. SMS and unstructured supplementary service data (USSD) are great examples of this; while much of the Western world has jumped onto the next big technology bandwagon, really crazy things are coming out in emerging markets, like USSD Internet, payment systems, ticketing, and more.

Turning the world upside down has as much to do with accepting the idea of localized success as it does with explosive global growth and massive vertical scale. Places like Africa have the concept of horizontal scaling, where a product or service is grown in smaller units but spread over multiple populations and communities, where smaller size has certain benefits. I talk a lot about horizontal versus vertical scaling with my friend Ken Banks, as we look to scale our own products (Ushahidi and FrontlineSMS) in a less traditional format. Entrepreneurs are driven to scale, but the definition of scale in the West tends to be monolithic, creating verticals that are incredibly efficient but that decrease resilience.

In this time of corporate and government cuts, when oversized companies are propped up in order to not fail, we shouldn't be surprised that solutions to the West's problems will come increasingly from emerging players like Africa. Instead of thinking of Africa as a place that needs to be more like the West, we're beginning to realize that the West would benefit from being more like Africa.

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1. We are fortunate to have excellent corporate partners at the iHub, one of which is Google, which provided some funding to get two initiatives off the ground.
2. The initial funding for a small high-performance computer (HPC) deployment has been funded by Google Africa Inc. Intel has added to the project with an Intel MultiFlex Server for use as the "master" component of the HPC cluster.